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ABSTRACT

The Intergenerational Behavioural Consequences of a Socio-Political Upheaval*

Social scientists have long been interested in the effects of social-political upheavals on a society subsequently. A priori, we would expect that, when traumas are brought about by outsiders, within-group behaviour would become more collaborative, as society unites against the common foe. Conversely, we would expect the reverse when the conflict is generated within-group. In our paper we are looking at this second form of upheaval, and our measure of within-group conflict is the 1966-1976 Cultural Revolution (CR) that seriously disrupted many aspects of Chinese society. In particular, we explore how individuals' behavioural preferences are affected by within-group traumatic events experienced by their parents or grandparents. Using data from a laboratory experiment in conjunction with survey data, we find that individuals with parents or grandparents affected by the CR are less trusting, less trustworthy, and less likely to choose to compete than their counterparts whose predecessors were not direct victims of the CR.

JEL Classification: C91, N4
Keywords: preferences, behavioural economics, cultural revolution

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1 Introduction

To a large extent, individuals' behavioural traits affect their social and economic decision making over their life-span. Abundant psychological studies have confirmed that nurture, especially exposure to adverse events in early life, affects individuals' behaviour. 'Adverse' effects investigated in the psychological literature range from parental divorce, child abuse (including sexual, physical, emotional, and neglect), to direct or intergenerational transmission of Holocaust experiences (see, for example, Niederland, 1968; Brodsky and Stanley, 2008; Norman *et al.*, 2012; Pechtel and Pizzagalli, 2011; Kellermann, 2013; Lovallo, 2013). Recently neurobiologists have discovered the potential mechanism through which childhood stress affects the formation of the brain, which in turn may affect adulthood decision making (Birn *et al.*, 2017). Economists have long studied how behavioural traits, such as risk taking, trust and trustworthiness, time preference, and competitive inclination, affect labour market performance, savings behaviour, as well as societies' social cohesion and social capital (Tabellini, 2010; Nunn and Wantchekon, 2011). Recently there is a rapidly growing economics literature that supports the idea of endogenous preferences (Voors *et al.*, 2012; Callen *et al.*, 2014; Bauer *et al.*, 2016; Hanaoka *et al.*, 2018), whereby individuals who experienced violence or natural disasters sometime in their life exhibit different behavioural patterns relative to their counterparts who did not have such experiences.

Using laboratory experiments and large scale survey data, this paper provides evidence that abuses suffered by individuals' parents or grandparents during the Chinese Cultural Revolution (CR) affect those individuals' economically-relevant behavioural traits 50 years after the event. The CR, which began in 1966 and ended ten years later, was the most long-lasting political upheaval in the Chinese Communist Party's (CCP) history and had the most pervasive impact on contemporary Chinese communities. During the CR, the authorities at different levels were challenged and then removed. Moreover, their representatives (government and CCP leaders), together with intellectuals, scientists, and artists as well as people who were deemed to be counter-revolutionaries, were openly criticised, denounced, physically tortured and emotionally humiliated. Many were killed and many committed suicide. There are no official statistics recording 'unnatural' mortality and the number of people otherwise affected during the CR. Unofficially, the estimates place the death toll at around 1.1 to 7 million and direct victims of some form of political persecution between 11 to 30 million (Yang, 2013; Walder, 2014).

How has such a large scale political persecution affected children/grandchildren of the victims? Fifty years on, can we detect any behavioural differences between children/grandchildren of the victims and their counterparts whose parents/grandparents did not experience any form of political persecution? These are important issues considering the vast numbers of CR victims, the potential effects on behaviours as indicated by studies of other large scale violence (Voors *et al.*, 2012; Callen *et al.*, 2014; Bauer *et al.*, 2016), and the potential impact of such effects on individuals' economic decision making.

The CR was a traumatic experience that extended to everybody in all age groups. Previous social science studies of the impact of the CR mainly focus on events that occurred to society or certain cohorts as a whole, including the large scale schooling interruptions in the urban areas and the sent-down youth movement, which assigned hundreds of thousands urban middle- and high-school graduates to rural

China during the CR. The outcomes evaluated are educational attainment, earnings, occupation, local economic growth and social trust (see, for example, Deng and Treiman, 1997; Zhou and Hou, 1999; Meng and Gregory, 2002, 2007; Zhang *et al.*, 2007; Bai, 2015; Wu, 2018).

Yet, to our knowledge, no economic study examines the long run effects on children who witnessed the denunciation, torture, and humiliation of their parents, and experienced social isolation during the CR.[1] This group will never forget such an experience, but does the impact go further and affect the development of behavioural traits? And does the impact go beyond one generation and affect their children as well? If so, what are the transmitting mechanisms? It is important for economists to understand these issues, as behavioural traits affect socio-economic decision makings. Prior to our study, to our knowledge, there exists no survey or experimental data in China that identify individuals who had such traumatic experiences during the CR.

In our laboratory experiment conducted in Beijing in 2015, we included a module in the exit survey questionnaire specifically asking people whether their parents and/or grandparents during the CR experienced one or more of seven different types of ill-treatment, humiliation, torture, or political persecution. This information allows us to clearly identify individuals whose parents/grandparents were affected and the degree of the effect. We find that those whose parents/grandparents experienced some types of mis-treatment during the CR behave differently from their peers whose parents did not. We focus in particular on a suite of measures of behavioural traits, — including trust, trustworthiness, competitive inclination, and risk.

While our findings on some behavioural traits are similar to those found in cases of violence experienced during civil wars or other violent conflicts, we differ from those studies in other traits, in particular with regard to pro-social behaviours, (see, for example, Voors *et al.*, 2012; Callen *et al.*, 2014; Bauer *et al.*, 2014, 2016; Shayo and Zussman, 2017; Karaja and Rubin, 2017). In those studies, the common observation is that people who experienced violence exhibit within-group pro-social behaviour (within-group altruism), whereas we find that children and grandchildren of the CR sufferers are less trusting and less trustworthy. The pro-social behaviour (within-group altruism) reviewed in Bauer *et al.* (2016) is considered to be a reaction to the invasion and mis-treatments from outsiders. In the case of the CR, however, the torture, mistreatment, and humiliation were often brought about by colleagues, former friends or subordinates, neighbours, or even relatives or family members. The in-group fighting is often regarded as the source of mis-trust. This is very similar to the situation discussed in Nunn (2008); Nunn and Wantchekon (2011), where within-group in-slavery created a culture of mistrust among African societies during the era of the slave-trade and such mistrust persisted over a long time.

Our findings show that not only were individuals who witnessed their parents being tortured and/or humiliated, affected, but so too was the next generation who did not directly witness such tragedies. Such a finding is similar to those found in the case of the Holocaust whereby children of Holocaust survivors who did not witness the tragedy experienced significant and long lasting mental health problems (see, for example Kellermann, 2013). A further examination indicates that, among those whose grandparents

[1] We find one very small sample (6 1st generation and 6 2nd generation observations) case study that was conducted by psychologists in Germany with their Chinese collaborators (Plankers, 2011). The study focuses on mental health issues rather than behavioural traits.

suffered from the CR, only those grandchildren who spent sufficient time with the grandparents during their primary schooling age were affected.

Are these results driven by a selection effect? In other words, are those whose parents/grandparents were persecuted during the CR a special group with some unobservable characteristics which make them less trusting, trustworthy, more risk loving, and less inclined to compete? We argue in the paper that this is unlikely to be the case. While the CR mostly affected a certain class of people (those who held higher positions, who were party members, and more educated), in general the literature on non-Chinese subjects has found that those with higher education and better observable qualities are more trusting/trustworthy and more willing to compete, which are opposite of what we found for this particular group (Dohmen *et al.*, 2010; Almas *et al.*, 2016; Falk *et al.*, forthcoming).[2] In addition, our results are largely unchanged and the precision of the point estimates improved when we implement an Altonji/Oster style test (Altonji *et al.*, 2005; Oster, forthcoming) by controlling for additional parental characteristics which roughly identify the people who were adversely affected during the CR.[3] Furthermore, the fact that only those who had direct contact with parents/grandparents exhibit the change in behaviour indicates that such a change is due to nurture rather than to nature. Nature-related factors (such as genes and innate ability) are intrinsically unobservable. Thus they are omitted variables in our regressions and are less likely to be covered by the Altonji-Oster type of test. Therefore our finding in favour of the nurture mechanism suggests that nature related omitted variables are unlikely to be the source of biases in our estimates of interest and hence lend further support to our Altonji-Oster type test results.

To further strengthen our understanding as to whether our results are driven by selection bias and at the same time to ensure that the results obtained from our laboratory experiment with total of 300 observations represent the general story, we replicate the results using two large scale household surveys. The household survey data not only ensures the sample representativeness but also enables us to use a Difference-in-Differences setting to identify the causal effect. We use the China General Social Survey (CGSS), 2003 and the China Family Panel Survey (CFPS), 2012, which have sufficient information regarding parental occupation, education, and party membership when the interviewees were young, as well as information on self-reported trust measure.[4] In this part of the study we use interviewees' birth cohort, their parental party membership and occupation during the CR period to identify the potential intergenerational impact of the CR on the victims. The results on the measure of self-assessed trust are largely consistent with the experimental finding.

To sum up, the contribution of our study is three-fold. First, it enriches our understanding of the long term impact of early childhood adverse experience on behavioural traits and hence socio-economic decision making. Although many studies have investigated these effects in other settings (war, other violent conflicts, or natural disasters), our findings confirm some similar behavioural patterns but differ from the previous studies in findings of pro-social behaviour. The fact that the CR reduced rather than increased pro-social behavioural traits, unlike the findings in the literature for other experience of

[2]The correlation between education/cognition and risk loving however goes the same way as the selection story. We will discuss this in more detail later.

[3]These characteristics include (parental education, occupation, party membership, and the class origins.

[4]None of these survey has information on other behavioural outcomes apart from trust.

conflicts, indicates that different institutional dynamics surrounding individuals' adverse experiences may generate very different long term behavioural outcomes.

Second, our study further confirms the intergenerational transmission found, for example, by Dohmen *et al.* (2012). The grandchildren of CR victims in our data did not witness the actual suffering of their grandparents. Nevertheless, we find that their behavioural preferences differ from their counterparts whose grandparents suffered no ill-treatment in the CR. More importantly, our analysis shows that such intergenerational transmission is through nurture rather than nature. This is because only those grandchildren who spent considerable time with their grandparents during their primary school years exhibit such a contrast in behavioural traits.

Finally, the CR is the most severe political and social upheaval to have occurred in Chinese society since the founding of the People's Republic of China (PRC), and our paper is the first to use laboratory experimental data together with survey data to examine the behavioural consequence of this important event. The CR seriously affected tens of millions of people and their families. During the CR, society as a whole experienced the blind worshiping of Mao on the one hand and unprecedented mistrust of any other authority, as encouraged by Mao, on the other. Conflicts, both violent and non-violent, occurred between the masses and representatives of authorities, between factions of colleagues, between friends, relatives, or even family members. The CCP in its official document identified that "the Cultural Revolution was an upheaval that...resulted in severe disaster and turmoil to the Party and the Chinese people."[5] And yet, fifty years on, studies of its deep behavioural impact on its population and society are almost nonexistent.

The paper is structured as follows. The next section provides a brief background about the Cultural Revolution, how it started, who were affected, and how they were affected, among other issues. Section 3 explains the experimental design, the survey data we used, our sample, and summary statistics. Section 4 presents the results from analysing the experimental data, and provides robustness tests of the sensitivity of our results to potential selection bias. Section 5 uses the survey data to replicate our results using self-assessed trust measures. The conclusions are given in Section 6.

2 Background

On May 16th, 1966 the CCP official newspaper the "People's Daily" published a CCP Central Committee *Notification*, later referred to as the "May 16 Notification", which announced the start of the Cultural Revolution. The *Notification* stated "Those representatives of the bourgeoisie who have sneaked into the Party, the government, the army, and various spheres of culture are a bunch of counter-revolutionary revisionists...", and this sets the justification for the CR. In essence, Mao had feared that CCP would abandon the pure communist ideology to slide into Soviet style revisionism ever since the failure of his efforts to push China onto the pure communist path during the Great Leap Forward and the reduction of his power within the CCP as a result (MacFarquhar and Schoenhals, 2006). Immediately after the publication of the *Notification*, all the schools in urban China were closed and the students from junior high school upwards were encouraged to criticise their head masters and teachers. It created a chaotic

[5] See *"The Resolution on Certain Historical Issues of the Party since the founding of the PRC"*, the document which was passed by the sixth meeting of the 11th Party Congress of the CCP in June the 27th, 1981 (Yang, 2013)

situation in most Chinese cities, where different factions of students (Red Guards) were not only fighting the teachers, head masters, and among themselves, they also went to the society at large to "eradicate" what was termed the "four olds"— old customs, cultures, habits, and ideas. They destroyed temples, statues, and many other historical sites, and burnt old books. Although the Politburo approved the general direction set by the *Notification*, many members were not enthusiastic or simply confused about it (Wang, 1989) and some tried to gear the chaotic situation towards more manageable situation. But that was not what Mao wanted.

In August that year, Mao, again in the "People's Daily", published an article entitled "Bombard The Headquarters — My Big-Character Poster". This set the clear tone for who should be the main target of the CR — those leading the headquarters.[6] Soon after, the Red Guards — in every corner and every level of society — overthrew their respective representatives of authorities. Individuals who held office in firms, governments, universities, schools and any other organisations were accused of being capitalist 'running dogs', traitors, spies, 'revisionists', so also were intellectuals and people who were from a suspect class (including former landlords or rich farmers, anti-revolutionaries, bad elements, and rightists). They were purged, put through "struggle sessions", which could be very violent involving beating, sustained and systematic harassment and abuse, and humiliation. Often the accused would be put on trucks with humiliating signs hanging over their necks to be shown around their respective cities. Their homes were being searched by the Red Guards for evidences that was supposedly indicative of anti-revolutionary acts. Many people, unable to bear the torture and humiliation, committed suicide.

The anarchic situation spread quickly all over the country and lasted for more than 3 years. From September 1966, students travelled everywhere to spread 'revolutionary seeds'. Railways and buses were free of charge for the 'revolutionary' students. Soon, violence between different factions of ordinary people occurred everywhere around the country. In many cases it involved open gunfire. For example, according to Chang and Halliday (2005) in one factional struggle in a factory in Guangxi, an estimated 100,000 people died. It was not until late 1968 to early 1969 that these chaotic situations were gradually brought to an end. Around this time, the primary and junior high schools were re-opened, but not the senior high schools and universities. Those who were at the age of graduating from junior and senior high schools had nowhere to go. From late 1968 graduates from junior- or senior-high schools were sent to rural areas around the country to reduce city unemployment. University graduates were also assigned jobs as factory workers, rural and small town school teachers. Many government and party officials, university lecturers, scientists, and factories and other work units also gradually recovered enough from the chaotic states to start production again. By 1972, most schools restored normal curriculum teaching, and workers and cardres returned to work. But fears of being accused of class enemies were real to everybody for the

[6]The full translation of this article can be seen in wikipedia "China's first Marxist-Leninist big-character poster and Commentator's article on it in People's Daily are indeed superbly written! Comrades, please read them again. But in the last fifty days or so some leading comrades from the central down to the local levels have acted in a diametrically opposite way. Adopting the reactionary stand of the bourgeoisie, they have enforced a bourgeois dictatorship and struck down the surging movement of the great cultural revolution of the proletariat. They have stood facts on their head and juggled black and white, encircled and suppressed revolutionaries, stifled opinions differing from their own, imposed a white terror, and felt very pleased with themselves. They have puffed up the arrogance of the bourgeoisie and deflated the morale of the proletariat. How poisonous! Viewed in connection with the Right deviation in 1962 and the wrong tendency of 1964 which was 'Left' in form but Right in essence, shouldn't this make one wide awake?" see *https://en.wikipedia.org/wiki/Bombard_the_Headquarters*.

remainder of the Culture Revolution: people were indoctrinated to fight against the 'class enemies' but the definition of it was vague and was up to each individual's own interpretation. The book entitled *"Ten Years of Madness — Oral Histories of China's Cultural Revolution"* (Feng, 1996) recorded the real life experiences of one hundred people during the CR. The other similar book entitled *"Victim of the Cultural Revolution: An Investigative Account of Persecution, Imprisonment, and Murder"* (Wang, 2004). The cases told in these books are traumatic and reveal the absurdity of how easily people can be accused of being 'class enemies' during those years and be put in prison or suffer from other types of persecution for those unfounded accusations.

During the entire ten years, tens of millions of people and their families were affected. Various estimates can be found on mortality and direct victims, but they vary significantly. Yang (2013) reports the CCP's own record of 1.73 million of 'unnatural' death, 1.35 million death penalties due to 'anti-revolutionary' behaviour and 2.4 million deaths during the armed battles between insurgent factions. In addition there were 4.2 million people illegally put in prison and 7 million disabled due to armed faction battles. Walder (2014), using data extracted from 2,213 county and city Gazetteers, reported the death toll of 1.1 to 1.6 millions and direct victims of the political persecution of 22 to 30 million over the period of 1966-1971. Although the number of deaths estimated in these studies are not as high as those estimated for catastrophes such as the Great Chinese Famine of 1959-1961 (see, for example Peng, 1987; Yao, 1999), the psychological trauma associated with over 10 years of social and political humiliation and oppression is unlikely to be captured by death toll figures.

To date, studies of the CR impact have largely stopped short of understanding the long-term behavioural impact of such oppression.

3 The Design, Sample, and Data

3.1 Experimental Data

3.1.1 *The Sample and the Treatment Identification*

In this paper we investigate whether individuals whose parents/grandparents were subject to social and political humiliation and oppression (the treatment group) during the CR present different behavioural patterns from those whose parents/grandparents were not subject to mistreatment during the CR (the control group). To do so, we first need to identify the treatment and control groups. Unfortunately, none of the household surveys in China ever inquired about individuals' own or family members' experience during the CR. To examine the questions at hand, we therefore added a special module in the exit-questionnaire of the laboratory experiment we ran in 2015 in Beijing. The module asks each individual to identify whether during the CR his/her father, mother, grandparents, siblings, uncles/aunties, or oneself: 1. was being criticised in big-character posters; 2. was denounced and suspended from the original position; 3. was criticised and tortured in 'struggle meetings'; 4. was being searched of family home for anti-revolutionary evidences; 5. was beaten; 6. was disabled as a result of the violence experienced during the CR; 7. died of unnatural death.

In our sample there is only one person in each category with sibling or self identified as being affected, and slightly more than 2% people identified that their uncle/aunties were affected. Considering also that the impact from more distant relatives (uncles and aunties) may be hard to gauge, this study only investigates the impact from one's own parents/grandparents.

The CR indicator is measured in three ways. First, we have a dummy variable indicating whether any of the parents/grandparents were affected at all (experienced any type of mistreatment). Second, we construct a continuous variable labelled 'CR intensity', which adds the number of mistreatments from each parent and grandparents (in the questionnaire, we have mother and father listed separately, but grandparents is in one category) together. Third, an adjusted intensity measure is constructed. This third measure assigns an intensity parameter to each of the seven type of mistreatments based on their severity. The assignment is as follows, 'being criticised in big-character posters' with a parameter of 0.5; 'denounced and suspended from the original position', 1; 'criticised and tortured in 'struggle meetings", 1.5; 'searched of family home for anti-revolutionary evidences', 1.5; 'being beaten', 1.8; 'disabled as a result of the violence', 2.4; 'died of unnatural death', 4. Of our total sample, one person indicated that his/her father died of unnatural death during the CR and one person's father was disabled as a result of torture during the CR.

The experiment was initially designed to elicit gender differences in individuals' behavioural traits resulting from exposure to different institutions. For this reason we sampled the following three birth cohorts from Beijing among the urban *hukou* population.[7] First, individuals born in 1958 (aged 8 to 17 during the CR), who are not too old to have lost their cognitive ability at the time of the experiment (aged 57 in 2015) but who are old enough to have spent their crucial development age during the CR. The second birth cohort is individuals born in the year the CR began (1966), while the third cohort is those born in 1977, one year after the end of the CR. We aimed at sampling around 100 individuals in each birth cohort from Beijing, and they are equally divided along the gender line.[8] Our final sample has 98, 117 and 119 observations for the three cohorts, respectively.

Figure 1 presents for the three cohorts their paternal age distribution at the beginning of the CR (1966). The mean fathers' ages at that time were 34, 28, and 17, respectively. As the majority of individuals adversely affected during the CR either held relatively high positions or were reasonably established in their intellectual fields and hence should be relatively old (in their 40s or 50s), the older cohorts in our sample are expected to be more likely to have parents affected, whereas the younger cohorts are more likely to have their grandparents affected. This is exactly what we find. The top panel of Table 1 shows the proportion of subjects whose father or mother was affected by birth cohort. Among the 1958 cohort, 22% of subjects had either father or mother being affected. If grandparents are also included, the ratio increases just marginally to 23% (see the bottom panel). For the 1966 cohort, the proportion of subjects with affected parents is 14%, and if we also include grandparents it increases to 18%. For those born in 1977, a very small proportion had their parents being affected (4%), whereas the proportion of grandparents affected is the highest among the three cohorts (14%=18%-4%). In total, if we count both

[7]The urban population (urban hukou) experienced more intensely both Mao?s push for gender equality and the CR than did the rural population (rural hukou).

[8]Booth *et al.* (2018) has a detailed discussion regarding the sample representativeness.

parents and grandparents for all cohorts, the ratio is 19%. This happens to be the reported proportion of CCP cadres who were being 'investigated' with formal case file records during the CR reported in the *Chinese Communist Party History, Volume Two: 1949-1978* (The CCP History Research Office, 2011).[9]

Table 1 also reports the proportions affected disaggregated by gender as well as cohort. The data we use in the current paper were also used in Booth *et al.* (2018), albeit to examine a different issue. There we found that women in the 1958 cohort are statistically more inclined to compete than their male counterparts due to the Mao era gender equality indoctrination. However, our current paper will show that those whose parents/grandparents were adversely affected during the CR are less competitively inclined. An obvious question is that, if there is a higher share of males in the 1958 cohort with parents/grandparents affected by the CR, is the Booth *et al.* (2018) finding driven by the CR effect? We find that this is not the case. In particular, we find that the CR effect for parents/grandparents is largely balanced by gender for each birth cohort, and the results found in Booth *et al.* (2018) are largely orthogonal to the findings in this paper. For example, we replicate the estimation of the competitive inclination equation in Booth *et al.* (2018) by adding CR intensity variable as an additional control and the point estimate for the 1958 male reduced slightly from 0.159 to 0.150 and the standard error remains the same. Thus, the p-value for the point estimate increased from 7.1% to 9.0%.[10]

3.1.2 *Experiments*

We conducted a suite of experiments with our sample subjects to elicit their preferences on risk, trust, trustworthiness and competition using games widely used in the experimental literature. Below we briefly summarise our experimental procedure and discuss the three financially incentivised games. The precise form of these games is given in the Appendix B.

Our sample subjects were invited to come to one of several identical lecture rooms in Peking University. The experiments were conducted in large lecture rooms, in which participants were seated separately, with enough space in between to ensure no interference from each other. The show-up fee was 75 yuan, equivalent to around US$12. Participation was voluntary and participants were told about the nature of the activities (incentivised game playing for research purpose) and that the exact amount they would earn depends on their own decision and their luck. During the sessions, all participants were given the opportunity to opt out but none took it. At the end of the experiment, one of the four incentivised tasks was randomly chosen for payment.

The experiments were conducted in Mandarin by a team of 15 to 20 trained student research assistants from Peking University under our direct supervision in April and May, 2015. Each participant received hard copies of the instructions for each game immediately before the beginning of each game, and these instructions were then also read out loud to the group as a whole. The games were played using pen and paper to avoid the potential problem that our older cohort might not be computer literate.[11] Participants

[9]The volume reports that during the CR 2.3 million different level of CCP cadres were 'investigated' with formal case files, which accounts for 19.2% of the total CCP registered cadres just before the CR. If including those without formal case files but were nevertheless being put through struggle meetings, tortured, or illegally arrested the ratio is much higher (The CCP History Research Office, 2011, page 967).

[10]These results are available from the authors on request.

[11]Participants were given an opportunity to ask questions, and test questions were included in the answering sheets for

marked their answer to each test question and their decision for each game on the answering sheets. The order of the games played in all sessions is the same: the risk game, the trust game, and the competition game. Only one of the three incentivised games is used for the final payment. The exact game which is used for final payoff in each session was determined randomly by drawing balls with number 1 to 3 from a box. If a particular game is chosen to be used for payment, another round of random draw will be conducted to decide which part of that particular game is used for payment. Below we discuss the three incentivised games.

The risk game is a series of lottery choices following Gneezy and Potters (1997). Subjects were asked to choose between receiving an amount with certainty (101 Yuan) or a lottery with a 50% chance of receiving a larger amount and a 50% chance of receiving nothing. There are 11 choices. The lottery-winning amount increases gradually from 135 yuan to 475 yuan. Risk-loving individuals would choose the lottery over certainty even at relatively small gain, while risk-averse individuals may choose the lottery over certainty only when the potential gain from so doing becomes sufficiently large. At the end of each session if the risk game is chosen to be used for the payment, the final payment choice for this game is then determined on a random draw of a pingpong ball from a box with 11 numbered balls (from 1 to 11) by one of the participants.

The trust game we apply in our experiment has been used in numerous studies to measure trust and trustworthiness (see Berg *et al.*, 1995; Camerer, 2003). Essentially, the participants are paired randomly and anonymously with another player in the group. They were told that the game has two players (Player 1 (the Sender) and Player 2 (the Receiver)) and each participant will play both roles in the game. As a Sender, each participant was given an endowment of 110 yuan. S/he has the option of sending some amount, x ($0 \leq x \leq 110$), to Player 2 (the Receiver). Any amount sent is tripled by the experimenter before it reaches Player 2. Both players are informed of this before the game starts. Player 2 then has the opportunity to send some amount s/he received from Player 1, y ($0 \leq y \leq 3x$), back to Player 1. The payoffs are thus $(110 - x + y)$ for Player 1 and $(3x - y)$ for Player 2. Player 1's behaviour in this game is interpreted as 'trust' and Player 2's behaviour as 'trustworthiness'. Whether the payment of this game is based on the Player 1's or Player 2's decision is determined by a toss of a coin. Again, at the end of each session if the trust game is chosen to be paid, a randomly chosen participant will toss a coin to determine whether the payment will be based on Player 1's or Player 2's decision. The head will indicate the payment will be based on the Player 1's decision and the tail, the Player 2's decision.

The competition game loosely follows that of Niederle and Vesterlund (2007). The task consisted of finishing as many as possible additions of sets of five two-digit numbers in five minutes. The game was played in three rounds but the payment method differed. The first round was paid based on piece-rate: each correct answer was compensated by 12 yuan. The second round was a compulsory tournament in which each subject was randomly assigned an anonymous partner. The winners were awarded 24 yuan for each correct answer while the losers received nothing. Subjects in the third round were asked to make a decision as to whether to be paid by piece-rate or tournament. The piece-rate payment is the same

each game to ascertain the instructions were fully understood. Most respondents answered the test questions correctly. We test the sensitivity of our results against inclusion of observations who fail to understand the instructions later in the paper.

as for round 1 while that for tournament is the same for round 2. However, for those who choose to compete, the result of the third round was compared with their partners' results in the second round to ensure that subjects' choice on competition is unrelated to issues other than competition inclination. The payment choice for the competition game is determined on a random draw of a pingpong ball from a box with 3 numbered balls (1, 2, and 3) by one of the participants at the end of the experiment if the competition game is chosen to be the game on which the final payment will be based.

From these games, we construct four outcome variables: trust, trustworthiness, risk aversion, and competitiveness. The variable on trust measures the proportion of the endowment the individual sent to his/her partner in the first round of the trust game. Hence, the higher the value the more trusting. Trustworthiness is defined as the amount of money Player 2 returned to Player 1 in the second round as a proportion of the amount he/she received from Player 1 in the first round. The higher the value the more the trustworthiness. Risk aversion is measured as the switch point the subject chose in the lottery game, while competitiveness is defined as a dummy variable indicating whether the subject choose to compete in the third round of the competition game.

3.1.3 *Exit Survey*

All participants were asked to fill out an exit survey questionnaire at the end of each session.[12] It requested information on general demographic details, labour market outcomes of the individuals and their spouses and parents. We also included, among other questions, a module on Big 5 personality traits, a series of questions designed to elicit information about the environment in which individuals were brought up, including the type of activities individuals used to do with their parents and grandparents during their primary school years, the attributes encouraged by parents and by schools during their growing up period.[13] A simplified 5-minutes Raven's Matrices Test was also administered to gauge participants' intellectual ability (Raven, 2000).

3.2 The Large-Scale Household Survey Data

As the cost of experiments are high, experiments rarely have large samples. Our sample of 300 individuals may not be regarded as representative despite our best efforts in assuring the randomness of the sampling (see, for a detailed discussion on sampling of our experiments Booth *et al.*, 2018). To this end, we also use large scale household survey data to gauge if some similar patterns can be found in these data.

The survey data need to have the following information. First, they need to have some measures of behavioural traits, albeit self-assessed and not incentivised. Many household surveys in China include some kind of measures about trust and risk aversion. Second, they need to have information on parental occupation, education, and party membership ***when respondents were young***. As none of the household surveys conducted in China inquire about the CR experience and ill-treatment directly, this second requirement allows us to crudely identify the group of individuals whose parents were more likely to have

[12] As the Exit Survey was conducted after all the games, it did not play a role of priming.

[13] These attributes include being independent, hard-working, responsible, imaginative, being tolerant and respectful of others, trusting other people, giving and looking after those less fortunate; gender equality; thrift and saving money; determination and perseverance; religious faith; unselfishness; and competitiveness.

been affected during the CR based on parental occupation, party membership, as well as respondents' year of birth. But it is this requirement that excludes all household surveys conducted in China except two: the China General Social Survey (CGSS) 2003 and the China Family Panel Survey (CFPS) 2012. It is these two surveys that we use.

The CGSS-2003 includes a question on trust: "In general, do you trust strangers in today's society? 1. Not at all; 2. Not really; 3. Somewhat; 4. Yes; and 5. Very much so.". In addition, it also requires interviewees to report their parents' education, detailed occupation and party membership when the respondents were aged 18. We use the detailed information on father's occupation to define a group of occupations which were more likely to be mis-treated during the CR including senior public, party, state owned enterprises and other organisation leaders and intellectuals.[14]. Given the nature of the CR, we also interact these occupations with party membership, as party members in these occupations were even more likely to be affected. Further we identify individuals who were aged between 6 and 18 in the first few years (1966-1968) of the CR (born between 1948 and 1962), as these cohorts were more likely to have witnessed parental trauma during the CR. The control group is defined as those born between 1963 and 1970. It is possible that some in the control group may also be affected, but our choice is a stricter definition, and, thus if we do find any effect it is likely to be a lower bound estimate. Further, we exclude the rural hukou population. This is not only because the effect of the CR on rural population may differ significantly from that of urban population, but also because our experimental sample only includes the urban hukou population.

The CFPS-2012 survey has two trust measures: a group of questions asking "To what extent do you trust the following people?" where the 'people' referred to here ranging from one's own parents to neighbours, strangers, doctors, cadres, and Americans. For each subquestion the interviewees were to value from '0' (not trust at all) to '10' (trust very much). The other question is "In general, do you think that most people are trustworthy, or do you think we must be careful when dealing with others?' and the answers are 1. 'yes, most people are trustworthy' and 2. 'one needs to be very careful when dealing with others'. We use the same sample selection rules as for the CGSS-2003 survey. The final estimating sample from CGSS-2003 is 1,673 and CFPS-2012, 3,409.

3.3 *Summary Statistics*

Table 2 reports from the experimental data the summary statistics of variables used in this study, disaggregated by whether parents/grandparents were affected by any of the CR mistreatment or not (the dummy variable on the CR treatment). The top panel reports the means and standard deviations for the outcome variables, while the bottom panel reports for the control variables. The last column of the table reports mean differences of the two groups.

The top panel of Table 2 shows that, at the mean between the treated and control groups, we observe no statistically significant difference in any of the outcome variables. However, when we examine the unconditional relationship between each of the behavioural traits variables and the intensity, we observe

[14]The occupations included are senior representatives of the party, governments, firms, and other organisitions at different levels, science and social science researchers, university professors, art and literary people, judges and prosecutors, media personnel, including editors, translators, and journalists.

clear relationships (see Figure 2). The more intensely the parents/grandparents were affected, the more likely that the individual is less trusting; less trustworthy; more risk loving and less likely to choose to compete. Using our adjusted measure of the CR indicator does not change the patterns uncovered here (see Appendix Figure A).

The bottom panel of Table 2 shows that, apart from individuals' own education and their parents' education, party membership, and father's occupation, nothing else is statistically significantly different between the two groups. Relative to the control group, the treatment group has better own-education, and their parents were also educated and more likely to be party members. Further, the fathers of this group are more likely to be government/party officials or intellectuals. Based on the discussion of the Section 2, these patterns are to be expected. For individual characteristics, we also include the measures of Big Five personality traits to ensure to control as much as possible for potential unobservables.

Table 3 reports the summary statistics for the CGSS 2003 (Panel A) and CFPS 2012 (Panel B) surveys. In those surveys, the only outcome variable we are using is self-assessed trust. We stratify the sample into two broad age cohorts — those born between 1948 and 1962 (the CR cohort) and those born between 1963 and 1970 (the non-CR cohort). They are then further disaggregated into two groups — those whose parents were in CR-affected occupations as well as being party members, and those whose parents were not in the first group. We report the summary statistics for the four groups of people. The mean values of the variables for the two CR groups are reported in columns [1] and [2], whereas for the two non-CR groups they are reported in columns [4] and [5]. The difference between the two CR groups and the two non-CR groups are reported in columns [3] and [6], respectively. Finally, the diff-in-diff results are reported in column [7].

There is a total of 1673 observations in the CGSS 2003 survey who belong to the specified birth cohort and have urban hukou. Among these, 57% are in the CR cohort and 43% in the non-CR cohort. Within the CR cohort, only 58 individuals (6%) had fathers who were in both CR-affected occupation and were party members when the interviewees were 18 years of age. The ratio for the non-CR cohort is slightly higher at 8.8%. The treatment group (father had both CR-affected occupation and was party member) accounts for 7.7% of the CR cohort in the CFPS 2012 survey, slightly higher than that in the CGSS 2003 survey. In the non-CR cohort it accounts for 8.6% of the sample. Relative to our experimental data, the ratio of treated (those whose parents had higher probability of being affected by the CR) here is much lower, suggesting our proximation for the CR treatment is narrowly defined. In other words, some treated people are possibly in the control groups. However, as we use diff-in-diff design, the lack of accurate identification may not be a real problem.

Column 7 of Table 3 in Panel A shows that the control group on average has 0.26 points higher trust scores than the treated group and the difference is statistically significant. For the total sample the mean score is 2.19 and standard deviation is 0.65. Thus, the difference in trust scores of the two groups is 0.4 standard deviation. In addition to the trust score, the control group is older and has more schooling years.

In Panel B we observe no statistically significant difference in either of the trust score measures. However, the sign is as we expected, that is the treatment group is on average less trusting. The

magnitudes as shown here are also small, around 7% to 9% of the standard deviations. There are no other statistically significant covariates except age, either.

4 Model Specification and Results from the Experimental Data

Consider the following regression equation:

$$Y_{ij} = \alpha + \beta CR_i^{pg} + \delta H_i + \gamma X_i + \rho Z_i + \theta W_i^p + \kappa S_j + \varepsilon_i, \tag{1}$$

where the subscripts i and j indicate the individual and the game session, and the superscripts p and g refer to parents and grandparents, respectively; Y_{ij} is a vector of behavioural traits obtained from the experiments, including trust, trustworthiness, risk aversion, and inclination to compete. CR_i^{pg} is the parents/grandparents CR intensity measure; H_i is a group of other relevant behavioural or non-behavioural variables which directly affect Y_{ij}. H_i varies for different Y_{ij}. For example, in our trust game setting, individuals' decision on whether to trust the anonymous partner is a risky bet. The literature often found that trusting is related to risk (see, for example, Cook and Cooper, 2003; Das and Teng, 2004; Siegrist and Gutscher, 2005). We also know that willingness to compete not only depends on one's perceived risk, ability to sustain pressure, and the degree of over-confidence, but also one's competence level (Niederle and Vesterlund, 2007; Booth *et al.*, 2018).[15] X_i is a vector of individual characteristics, including gender, birth cohort, years of schooling, IQ score, and one's economic position (log of monthly income). The reason we include log of monthly income is because many of the decisions made in the games are related to people's current financial condition. Z_i is a group of personality traits (Big 5, and whether or not the individual is optimistic[16]). W_i includes parental characteristics, including mother's education and father's age. Later in the paper we test sensitivities of adding additional parental controls.[17] S_j is a group of experimental session specific controls, including the date the experiment was conducted, whether the session was single sex or mixed sex session, and the number of people in the session. Finally, ε_i denotes the random error term.

4.1 The Main Results

We estimate Equation 1 using a Tobit or Probit model depending on the nature of the dependent variables. The estimated results for the main regressors are presented in Panel A of Table 4. To summarise, the results presented here indicate that those individuals whose parents/grandparents were affected during the CR are less trusting, less trustworthy, more risk loving, and less likely to choose to compete. The

[15] In particular, for H_i, in the trust equation we include risk preference; in the trustworthiness equation we include log of total amount received from player A; while in the competition equation we include individuals' actual performance in round 2 (competence level), the difference in the number of correct answer between rounds 1 and 2 (ability to sustain pressure), and the difference between self-rated ability rank and the actual rank among the participants (over-confidence). There may be a concern that risk is an endogenous variable and should not be included into the trust equation. To address this concern, we also estimate a version of Trust equation without including risk and the results only change marginally. These results are available upon request from the authors.

[16] Optimism is measured from a question in Exit Survey which asked people to rate the probability that tomorrow the sun will be shining. Conditional on the date of the experiment, it is a good proxy for individuals optimism.

[17] Due to assortative mating, mother's and father's education level are highly correlated. Thus, we only use mother's education here. Using father's education does not change the results.

sign on trustworthiness indicates that they are also less trustworthy, but the point estimate is not precise. Using OLS estimation (see Panel B) gives us a more precise estimate of being less trustworthy, though.

As indicated earlier, the dependent variable for trust is measured as the share of the total endowment sent to Player 2. One additional unit of CR intensity score reduces the share of the endowment sent to one's partner by 2.5 percentage points, which is around 11% of the standard deviation for the sample as a whole. Among the sample whose parents/grandparents were affected in any way, the mean intensity score is 1.93. Thus, on average they sent 4.8 percentage points less than their counterparts whose parents/grandparents were not affected by the CR.

The measure for trustworthiness is the proportion of the total amount Player 2 received from Player 1 that s/he sent back to Player 1. We include in the regression the log of total amount Player 1 sent to Player 2 and the marginal effect reported for this variable measures the reciprocity of Player 2. Our estimated coefficient is 0.09, which indicates that for every 10 percent increase in the amount the Player 2 received from Player 1, there will be a 0.9 percentage point increase in the amount the Player 2 sent back.[18] Conditional on this general reciprocity, individuals whose parents/grandparents were being mistreated sent back 0.8 (or 1.2, in the linear regression) percentage point less for every additional unit of CR intensity measure.

Risk aversion is measured as the switching point that individual chose to change his/her position from a certainty choice to a gambling choice.[19] The variable ranges from 1 to 12 with 1 being where the individual always chooses to gamble and 12 being where she never chooses to gamble. More risk averse individuals will require a greater gambling gain to be induced to shift from a safe outcome to a risky one, and will thus have a higher switch point. Our treatment group chose a lower switch point than the control group. Every additional unit of CR intensity suffered by parents/grandparents induces a 0.26 point reduction in the switching point. At the mean of 1.93 CR intensity units and the 3.9 standard deviation for risk aversion, our estimated effect indicates that at the mean CR intensity the effect is measured at 14% of the standard deviation. However, the coefficient is not precisely estimated.

The measure of willingness to compete is a dummy variable that takes the value one when the individual chose to compete in the third round of the competition game, zero otherwise. This is the only regression which is estimated using a Probit model. The rest are all using Tobit model. The estimated marginal effect indicates that one additional unit of CR intensity score reduces an individual's probability of choosing to compete by 6.6%. With the mean value of probability to compete for the sample as a whole being 34%, at the mean CR intensity score (1.93), the effect amounts to 12.7%, or almost 37.5% of the mean value.

In panel B of Table 4 we report the same regression using OLS. Panel C reports the OLS estimation with the adjusted CR intensity as the main independent variable. As can be seen, the results are not very sensitive to either the estimation method or to the measure of CR intensity used. The estimated marginal effects are around the same size and significance level. We also used principle component method

[18] Using data from Cameron *et al.* (2013) which also sampled Beijing residents for some younger cohorts (those who were born in 1975, 1978, 1980, and 1981) we estimated the trustworthiness regression and the coefficient obtained from that sample on reciprocity is 0.11, which is very similar to what we obtained here.

[19] See Appendix B on page 47 regarding how the rules in the game setting to ensure a unique "switching point" is chosen by each subject.

to generate an CR intensity index and the results are very similar to what are observed in Table 4.[20]

4.2 Correlation or Causality?

The CR, to a large extent, affected the group of people who held high positions and were party members, and those who were intellectuals. This can be confirmed from our data (see Table 2). Given this fact, an obvious concern is that the results observed in Table 4 may be subject to selection biases. For instance, if the type of people who were likely to have received mistreatment during the CR happen to exhibit the behaviour observed in Table 4, our estimated effects might be due to selection rather than to the CR mistreatment. In general, when facing a potential sample selection bias, IV estimation would be preferable. The literature often uses regional and/or cohort variations in policy change as the IV. In our case, however, it is very hard to come up with a valid IV, as all our subjects were born and grew up in Beijing (no regional variation) and there are only 3 birth cohorts (very limited cross-cohort variation).

Given this, we consulted the literature on the relationships between individuals' behaviours and their human capital and the intergenerational transmission of behaviours in order to gauge the direction of the potential biases. The empirical literature generally finds that prosocial behaviour (trust and trustworthiness) and willingness to compete are positively related to individuals' own and their parents' human capital, while risk aversion is negatively associated with one's own and his/her parents' education (Dohmen *et al.*, 2012; Falk *et al.*, forthcoming). These suggest that omitting parental unobservable qualities (assuming these omitted qualities are positively associated with observable parental human capital) may generate over-estimated coefficients on trust, trustworthiness, and willingness to compete, except for risk aversion. In absolute value terms, the estimated magnitudes of coefficients on trust, trustworthiness, and willingness to compete should be larger had we not had the omitted unobservable parental characteristics variables. For risk aversion, however, the absolute value of the coefficients should be smaller. Thus, the potential biases due to sample selection should not affect our conclusion with regard to trust, trustworthiness, and competition, but may affect that regarding risk aversion. Also, the link between the CR intensity and risk aversion presented in Table 4 seems to be very weak and sensitive to how CR intensity is measured.

To investigate further on the causal relationship, we employ the Altonji *et al.* (2005); Oster (forthcoming) style test. Five additional sets of control variables of parental characteristics are included in the estimation of Equation (1): mother' party membership, father's education, father's detailed occupation (a set of 27 dummy variables), and mother's and father's class origins.[21] The results are reported in Panel D of Table 4. As can be seen, the estimated effects on the CR intensity measure have not changed much. If anything, the point estimates are slightly larger and more precisely estimated in most cases, while the adjusted R-Squared increased. That our coefficients of interest are largely stable when potentially relevant parental characteristics are added in, and the goodness of fit of the model also improved, suggest that the bias from the "unobservable" parental characteristics has to be very large to wash away our

[20] These results are available upon request from the authors.

[21] During the Mao era, everybody was classified into a 'class origin', which indicated your father's class category given to him at the time of the land reform implemented by the Chinese Communist Party in the late 1940s or the early 1950s.

observed effect. It is therefore unlikely that they are driven by omitted variable bias (Altonji *et al.*, 2005; Oster, forthcoming).

In the next subsection, we provide further evidence to shed light on the extent to which our estimates of interest may be driven by omitted variables. Specifically, we examine whether the intergenerational transmission of the behavioural traits we observe here is mainly due to nurture or nature. The hypothesis behind this examination is that the nature-related factors, such as genetic factors, are intrinsically unobservable and should be essential parts of the omitted variables in our regressions. The Altonji *et al.* (2005); Oster (forthcoming) test we performed above cannot test the potential bias generated from omitted intrinsically unobservables (nature related variables). Thus, if the intergenerational transmission mainly operated through nurture rather than nature, it is unlikely that the omitted variables in our regressions would cause serious biases in our estimates of interest.

Finally, to provide further evidence to support our causality claim, in Section 5 we will use two large-scale household survey data sets to perform a difference-in-difference identification strategy. The strategy compares the differences in traits between those who were more susceptible to CR mistreatment and those who were not among the treatment group (cohorts aged 6 to 18 in the first three years of the CR), relative to the differences for the control group (cohorts aged 5 or younger during the period).

4.3 Why Grandchildren? Nature vs. Nurture

Our analysis so far groups individuals whose parents were affected and those whose grandparents were affected into a single treatment group. This is due to the fact that the sample is small, and separating the two treatment groups may generate imprecise estimates.[22] Nevertheless, the question remains as to why, and how, grandchildren, who had never witnessed the suffering of their grandparents, would be affected by the CR. We address this concern in this subsection.

More importantly, the fact that we find grandchildren are adversely affected raises a question — mentioned above — of whether such an intergenerational transmission is due to nature or nurture. While an understanding of the mechanisms that underlie the intergenerational transmission is intriguing in its own right, it can also shed light on the causality issue we discussed in the previous subsection. Since nature-related factors, such as innate abilities and endowments, are inherently unobservable, they are more likely than the nurture-related variables to be omitted variables in the regressions and less likely to be tested in the Altonji *et al.* (2005); Oster (forthcoming) style test. Given this difference between the two types of variables, if we find that nature dominates the intergenerational transmission, a concern should be raised because the omitted variable biases may post a serious threat to our estimated effects of the CR mistreatment. However, if the intergenerational transmission mainly functions through nurture, this finding will lend more support for our Altonji *et al.* (2005); Oster (forthcoming) style test.

In the post-experiment exit survey we included a module which asks each individual during their primary school years whether their mother/father/grandparents (separately) played with them, read to them, helped them with homework, or if they had rarely seen their mother, father, or grandparents.

[22] The total number of observations whose parents were affected by the CR is 43, while those whose grandparents were affected is 26.

Using the last option, we seek to answer the questions posed above. The idea is simple. Behavioural traits are normally thought of as transmitted intergenerationally through either nature or nurture. If it is through nurture, direct contact is essential, whereas if nature is the only channel, direct contact should not make a difference. To identify which channel enables grandchildren to be affected, we interact 'CR intensity' with dummy variables indicating 'rarely had seen either father or mother ' or 'rarely had seen grandparents' during the primary school years.

In our sample, a little over 19% of the total number of individuals indicated that they had rarely seen either their mother or father during their primary school years, while among those whose parents/grandparents were mistreated this proportion is a little over 18% (or 9 subjects). For grandparents, this ratio is much higher: 40% of the total sample and 48% of CR-affected sample rarely saw their grandparents. As the sample for no contact with parents is too small and that for subjects who were children of victims they would more likely to have witnessed the suffering of their parents, here we mainly test the hypothesis of nature effect from those whose grandparents were victim and they themselves had no contact with their grandparents. Thus, Equation 1 becomes:

$$Y_{ij} = \alpha_1 + \alpha_2 DP_i + \alpha_3 DG_i + \beta_1 CR_i^{pg} + \beta_2 CR_i^g * DG_i + \delta H_i + \gamma X_i + \rho Z_i + \theta W_i^p + \kappa S_j + \varepsilon_i, \quad (2)$$

where DP_i and DG_i are dummy variables indicating if individuals rarely saw their parents and grandparents, respectively. If nurture is the channel, we expect that β_2 should have different sign from β_1 and may even be statistically significant. More formally, if nurture is the only channel, we should find that $\beta_1 + \beta_2 = 0$.

The selected results from the estimation of Equation 2 are reported in Panel A of Table 5. We find that in general the effects for subjects which have direct contact with grandparents and those with no direct contact with grandparents differ indeed. In particular, for those who had no direct contact with grandparents the CR intensity effects have mostly different signs from those who did have direct contact. Moreover, the tests of $\beta_1 + \beta_2 = 0$ confirm that nurture but not nature is the channel. In the case of trust, those grandchildren whose grandparents were victims during the CR but rarely had any contact with their grandparents are actually more trusting, opposite of what is observed for their counterparts who had contact with their grandparents.

In Panel B of Table 5, we include the dummy variable on 'no contact with either parents or grandparents' and its interaction term with the grandparents CR intensity measures. The results confirm the findings in Panel A. Comparing the results in Panel B with those reported in Panel B of Table 4 (the most comparable results in that table), we find the following. If we exclude the group whose grandparents were adversely affected during the CR but who themselves had no direct contact with their parents or grandparents during the primary school years, the CR intensity effects are larger on most of the behavioural traits we measure here.

We also examined whether the intergenerational transmission of these behavioural traits is due to CR victims teaching children certain type of attributes or if, because of the CR experience, these children have developed certain personality attributes. The exit survey asked people to identify, from a list of 14 different attributes, whether their mother or father have encouraged them to have during the period they were growing up — being independent, hardworking, responsive, having imagination, being tolerant and

respect others, trust others, care and help needy people, gender equality, thrifty, determination, religious beliefs, being unselfish, and being more competitive. Using these attributes as dependent variables we estimated whether children of CR victims are more likely to be taught of some of these attributes. Controlling for all parental characteristics included in Panel D of Table 4, we are unable to find any difference in patterns between those whose parents were mistreated during the CR and those whose parents were not. Those whose grandparents were mistreated during the CR were more likely to have been taught to be hard working, determined, care for needy people, being thrifty and being unselfish. However, due to the small sample, we do not wish to put too much emphasis on these, though we would point out that the same patterns are not found when we examine whether school taught them such attributes. Further, we did not find systematic difference in personality traits, especially for those whose grandparents were adversely affected by the CR. For those whose parents were mistreated, we find that they are more open.[23]

To sum up, our results suggest the CR behavioural impacts on children/grandchildren arise mainly due to direct contact with parents/grandparents. While such effects do not appear to be through parents day-to-day teaching, it could be through some kind of role model effect. However we do not have hard evidence on this particular mechanism.

4.4 Discussion

Up until this point, we observe that those individuals whose parents/grandparents were adversely affected during the CR exhibit different behavioural traits relative to their peers whose parents/grandparents were not directly affected by the CR. We have shown and will continue to show that the observed effect is unlikely to be due to omitted variable bias. In particular, we find little evidence that these effects are due to nature, which would more likely to be omitted factors. Some of our findings are consistent with the current literature on behavioural change due to adverse experience and others are not. In this subsection we pay attention to the sign of these effects and discuss, as much as we can, why we think these behavioural traits may be formed as a result of the adverse experience suffered by parents/grandparents during the CR.

We first focus on trust and trustworthiness. These behavioural traits are often regarded as important social capital, which helps to 'improve the efficiency of society by facilitating coordinated actions' (Putnam, 1993). Societies with less trust and trustworthiness tend to be less coherent, less stable, which in turn may affect long term economic performance (Nunn, 2008; Fehr, 2009; Nunn and Wantchekon, 2011).[24] Nunn and Wantchekon (2011) explained how individuals of the same or similar ethnicities enslaved one another in African countries during the slavery trade period. They also showed how this may be one of the key factors which generated mistrust in the society. Another study that finds a similar phenomenon is Cassar *et al.* (2013). It examines the effect on trust from a within-group conflict between former communists and a diverse group of oppositions in Tajikistan. The war was described as local

[23] These results are available upon request from the authors.

[24] Studies also found that trust level is associated with inflation and financial market development (Zak and Knack, 2001; Guiso *et al.*, 2004, 2006).

within-community fighting. The study finds that exposure to civil war in Tajikistan results in decreased level of trust.

In contrast, many recent studies have stressed how war or violent experience can foster pro-social behaviour. They show that after the war/conflicts, people on average become more cooperative and altruistic towards their own ethnic/identity groups (see, for a detailed review, Bauer *et al.*, 2016).

The contradictory findings may, to a large extent, be related to the nature of the violence or the conflicts experienced. In general, if traumas occurred due to intra-group conflicts, trust in others is reduced as 'betrayal aversion' come into effect (Bohnet *et al.*, 2008; Fehr, 2009). On the other hand, if the trauma was brought about by inter-group conflict, within-group bond strengthens and individuals become more cooperative within that group. The situation of the CR fits in the first scenario. During the first few chaotic years of the CR potential perpetrators of mistreatments might be former colleagues, subordinators, neighbours, friends, and even family members. Under such a social environment, individuals' 'betrayal aversion' increases and they would become less trusting and, as a result, they may also become less trustworthy.

The findings in the economic literature on the relationship between exposure to traumatic events and risk are mixed. While some studies found that violence or natural disasters increase people's risk-seeking behaviour (see, for example, Eckel *et al.*, 2009; Malmendier and Nagel, 2011; Voors *et al.*, 2012; Karaja and Rubin, 2017; Hanaoka *et al.*, 2018), others uncover positive relations between violent exposure and risk aversion (Callen *et al.*, 2014; Cameron and Shah, 2015; Cassar *et al.*, 2017). The existing literature relevant to our finding so far largely focuses on uncovering the association or causal relationship between exposure to adverse experience and risk. With regard to reasoning, we have seen some conjectures, such as exposure to violence or disasters changes people's preference (Voors *et al.*, 2012), or generating strong emotional response (Hanaoka *et al.*, 2018). While previous studies often examine an average effect on a society as a whole (a civil war on the exposed communities, for example), our study identifies a small group of individuals being particularly affected. Thus, while other studies could conjecture that the change in behaviour could be related to the change in social norms or social preference (Bauer *et al.*, 2016), it is less likely to be the reason behind our findings. Further, given our results on risk are weak and sensitive to the way CR intensity is measured, we are inclined to play down our finding on the CR-risk association.

Finally, studies of the impact of adverse experience on individuals' willingness to compete are non-existent. Some psychologists believe that being competitively inclined is instinctive to human beings as a form of self-protection, and that only when children start interacting with other people do they learn that cooperation rather than competition may produce better outcomes for all (McClintock *et al.*, 1977). Most economists argue that lack of confidence, risk aversion, feedback aversion, and pure preference for competition are all important factors in determining people's inclination to compete (Niederle and Vesterlund, 2007). While we can exclude the risk aversion factor, families that suffered from long term oppression during the CR may easily lack self-confidence, be more feedback averse, or simply form the habit of wanting to "keep their heads down" to avoid attracting unwanted attention. All of these could generate the outcome of being less competitive, though in the regression we do control for over-confidence.

5 Results from Survey Data

The above findings are from our 2015 Beijing experiment. To strengthen our findings both in terms of sample size and investigating causality, we next explore a different strategy. In this section we use large scale survey data and Diff-in-Diff. As discussed before, none of the household surveys conducted in China directly identify the CR victims. Thus, it is not easy to find surveys with information on individuals' self-reported behavioural traits as well as enough information to allow a more accurate identification of parents/grandparents being the CR victims. After intensive search, we found two surveys that suit our purpose of examining the effect of the CR ill-treatment on trust of children of victims. These are the China General Social Survey (CGSS) 2003 and the China Family Panel Survey (CFPS) 2012 as discussed in sub-section 3.2.

The Diff-in-Diff specification is presented in the following equation:

$$Y_i = \alpha_1 + \alpha_2 CR_i + \beta_1 Pty_i^f + \beta_2 HOC_i^f + \beta_3 (Pty_i^f * HOC_i^f) + \theta CR_i * (Pty_i^f * HOC_i^f) + \delta X_i + \kappa Z_i^p + \upsilon_i, \quad (3)$$

where superscripts f and p refer to father and parents, respectively. CR is a dummy variable denoting the CR cohort who were aged between 6 and 18 in the first three years of the CR (those born between 1948 and 1962). Pty_i^f and HOC_i^f are two dummy variables indicating whether individual i's father was a party member or belong to the occupation categories which were deemed to be more likely to receive mistreatment during the CR, as explained earlier (see footnote 14), respectively. We use the interaction of these two dummy variables to better identify the CR mistreatment of the father. We then further interact the CR dummy with the interaction of $Pty_i^f * HOC_i^f$ to identify the impact on their children of parental mistreatment during the CR. Those in the control group ($CR_i = 0$) are people born between 1963 and 1970. X_i is a vector of individual controls, including age, gender, dummy for being married, education, and five dummy variables indicating job satisfaction.[25] Z_i^p is a vector of parental controls at the time when the child was 18 (for the CGSS 2003) or 14 (for the CFPS 2012), including father's occupations (rather than HOC), age, education, mother's education and party membership. The coefficient of interest in Equation 3 is θ.

The results using CGSS 2003 and CFPS 2012 are reported in Panels A and B of Table 6. In the table, we first report the estimation for the CR cohort alone (columns (1)-(3)) and for the control cohort alone (columns (4)-(6)). The last three columns (columns (7)-(9)) report the Diff-in-Diff estimations with combined sample as shown in Equation 3.

Panel A reports the results using CGSS 2003 data. The trust variable used is whether or not the respondent trusts strangers in today's society. The answers ranges from 1 (not at all) to 5 (very much so). Thus, a negative coefficient indicates less trusting strangers. When using the five category variable as the dependent variable we estimate the equation using both OLS (columns 1, 4, and 7) and Ordered-Probit (column 2, 5, and 8) models. The results are consistent with different estimation methods. They show that for the CR cohort, those with fathers both being party members and belonging to the likely

[25] In the experimental data we controlled personality traits and optimistic indicators. In the survey data, however, these variables are not available. The available variables which are somehow related to personality is job satisfaction and this variable is available in both surveys. We therefore include it in our estimation and it is statistically significant.

mistreated occupations during the CR are less likely to trust strangers than their counterparts whose father did not belong to this group. For the non-CR cohort, though, the effect is small positive. When we combine the two cohorts into the same estimation, we see that the Diff-in-Diff estimate is statistically significant using either OLS or Ordered-Probit models. In Columns 3, 6, and 9 we redefine the dependent variable as a dummy variable that equals one if the individual trusts strangers very much (answer to the question equals 5), and zero otherwise. The results for the CR, non-CR cohorts as well as combined samples are also similar to those using the categorical dependent variable.

Panel B presents the results using CFPS 2012 data. The trust variable in that survey comprises six different questions: trust parents, neighbours, cadres, doctors, strangers, and Americans. The answer ranging from '0' (not trust at all) to '10' (trust very much). The dependent variables we use in Panel B are either the mean trust in neighbours, cadres, doctors, strangers, and Americans[26] or the sum of theses for a total trust. The first six columns of the results using both mean trust and sum of trust are similar in sign to those observed using CGSS survey but apart from the Ordered Probit estimate for the CR cohort the point estimates are not precise. Based on the signs of the coefficients we observe, for the CR cohort it is those whose parents in the likely CR mistreatment group (party member and in the mis-treatment occupations) that are less trusting, while the opposite pattern is observed for the non-CR cohort. However, when we combined the two cohorts together, the point estimation of the Diff-in-Diff coefficient is not precise. Nevertheless, we observe the expected signs.

These results lend additional support to our findings using the lab experimental data. We find that the children of the CR victims are less trusting than their same cohort counterparts whose fathers were not CR victims. Further, using the same definition for potential treatment group (father were party members and in the CR mistreatment occupation) for the post-CR cohort we do not find the same pattern. These Diff-in-Diff results lend additional support to our claim for a causal interpretation of our results. It was the CR mistreatment of the father that induced the lack of trust in the children.

6 Conclusions

The Cultural Revolution was a political upheaval that disrupted many parts of Chinese society. Although it was not all outright violent, the depth and the degree of psychological damage to the society was profound and may persist for much longer than if it were simply violence.

Using laboratory experimental data together with survey data, we examined how physical, mental, and psychological mistreatment during the CR changed the behavioural traits of children and grandchildren of the victims. In the lab experiment, we identify the treatment group as people whose parents and/or grandparents received one or more types of mistreatment during the CR. We found that, relative to people whose parents/grandparents were not mistreated, individuals in our treatment group are less trusting, less trustworthy, less competitively inclined, and somewhat more risk loving.

The literature on the effects of traumatic experiences on people's behaviour is mixed in terms of whether these traumatic experiences encourage or suppress certain behavioural traits. Our findings,

[26] We exclude trust for parents from the construction of the dependent variable as there is not much variation in the answer.

therefore, are consistent with some studies while deviating from others. In particular, our finding that pro-social behaviours, in our case, trust and trustworthiness, were curtailed among children/grandchildren of the CR victims are consistent with results of studies which examine within-society conflicts, while at odds with findings examining violences occurred across different communities. We stress in the paper that it was not the violent act per se that generated different behavioural consequences, but the environments under which the violence occurred. Human beings learn from their experience. When violences were brought about by outsiders, within-group cooperation and collaboration is particularly advantageous to defeat the invaders. Thus the behavioural consequence of invasion type of violence would be within-group cooperation and trust. However, when violence was brought about by neighbours, learning to not trust them would be the first lesson to defend yourself. We suggest that any conflicting findings from the literature on behavioural consequences can be reconciled if the detailed circumstances of these traumatic events can be properly understood in the same vein as we discussed here.

Finally, there is an important issue regarding the level of impact we found. Our findings of the CR effect should be regarded as lower bound estimates. As indicated earlier, the CR affected everybody in the society. It affected not only people mistreated during the CR but also those in the control group who witnessed the untrustworthy behaviour of their neighbours and friends. This should affect their behaviour too. Our finding of statistically significant differences in behaviour traits between the treated and control groups indicates that such society-wide experience had a much stronger impression on those who bore the brunt. But it should not be forgotten that this is not the only group that was affected.

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Table 1: Proportion of parents/grandparents adversely affected during the CR

		% of parents in each cohort were affected by CR			
	Total	Males	Females	Diff.	No. obs.
1958	0.22	0.24	0.21	0.03	98
	(0.42)			[0.09]	
1966	0.14	0.15	0.12	0.03	117
	(0.35)			[0.06]	
1977	0.04	0.02	0.07	-0.05	119
	(0.20)			[0.04]	
Total	0.13	0.126	0.131	0.005	334
	(0.34)			[0.04]	
		% of parents & grandparents were affected by CR			
	Total	Males	Females	Diff.	No. obs.
1958	0.23	0.27	0.21	0.06	98
	(0.43)			[0.09]	
1966	0.18	0.20	0.16	0.04	117
	(0.39)			[0.07]	
1977	0.18	0.02	0.07	-0.05	119
	(0.38)			[0.04]	
Total	0.19	0.17	0.18	0.008	334
	(0.40)			[0.07]	

Notes: Authors' own calculations.

Table 2: Summary Statistics of the Experimental Data

	Parents/Grandparents Not Affected by the CR		Parents/Grandparents Affected by the CR		Difference
	Mean	Std. Dev.	Mean	Std. Dev.	
Outcomes:					
Trusting: % sent.	0.35	0.22	0.34	0.22	0.003
Trustworthy: % returned	0.21	0.16	0.19	0.13	0.01
Risk aversion: switching point	7.02	3.99	7.16	3.87	-0.14
Choose to compete	0.35		0.32		0.03
Individ./family characters:					
Log Income	8.52	0.57	8.50	0.68	-0.02
Dummy for male	0.47	0.49	0.51	0.50	-0.04
Years of schooling	13.15	2.66	13.86	2.73	-0.71**
IQ test score	5.87	2.43	6.23	2.32	-0.36
Birth cohort:					
1958	0.28		0.35		-0.07
1966	0.36		0.32		0.04
1977	0.36		0.32		0.04
Mother's years of schooling	8.13	4.44	9.61	4.19	-1.48***
Father's years of schooling	9.36	4.24	11.17	4.24	-1.82***
Mother being a CCP member	0.14		0.26		-0.12**
Father being a CCP member	0.45		0.59		-0.14**
Mother cadres/intell.	0.30		0.37		-0.07
Father cadres/intell.	0.38		0.54		-0.16**
Father's age	72.17	16.00	75.46	13.14	-3.29
No. of siblings	1.67	1.43	1.83	1.63	-0.16
Optimistic	82.26	22.17	84.46	21.01	-2.20
Big five personality:					
Openness	3.28	0.63	3.35	0.46	-0.08
Neuroticism	2.64	0.60	2.65	0.52	-0.01
Agreeableness	3.67	0.68	3.76	0.46	-0.09
Conscientiousness	3.49	0.68	3.50	0.50	-0.01
Extraversion	3.30	0.66	3.30	0.48	0.00
No. of obs.	269		65		

Notes: Authors' own calculations.

Table 3: Summary Statistics for CGSS 2003 and CFPS 2012

	CR Cohorts (1948-1962)			Non-CR Cohorts (1963-1970)			Diff-in-Diff
	Father was not	Father was		Father was Not	Father was		
	Party+high occ	Party+high occ	Difference	Party+high occ	Party+high occ	Difference	
Panel A: CGSS 2003	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Trust strangers?	2.16	2.03	0.13	2.24	2.36	-0.13	0.26**
Dummy for males	0.49	0.52	-0.02	0.48	0.43	0.05	-0.07
Age	46.97	45.72	1.24**	36.54	37.16	-0.62*	1.86***
Dummy for married	0.92	0.93	-0.01	0.93	0.93	0.00	-0.01
Years of schooling	10.65	11.72	-1.08***	11.27	13.37	-2.10***	1.02**
Job satisfaction score	3.67	3.38	0.29	3.60	3.60	0.00	0.29
Father years of schooling	5.96	7.55	-1.59***	7.30	9.98	-2.68***	1.09
Father CCP member	0.28	1.00	-0.72***	0.30	1.00	-0.70***	-0.02
Father is cadres/intellectual	0.02	1.00	-0.98***	0.02	1.00	-0.98***	0.00
Father age	72.25	71.40	0.85	64.30	60.67	3.63	-2.78
Mother years of schooling	3.39	4.69	-1.30**	5.29	6.57	-1.28**	-0.02
Mother CCP member	0.06	0.22	-0.16***	0.05	0.28	-0.22***	0.06
No. of obs.	899	58		658	58		
	CR Cohorts (1948-1962)			Non-CR Cohorts (1963-1970)			Diff-in-Diff
	Father was not	Father was		Father was Not	Father was		
Panel B: CFPS 2012	Party+high occ	Party+high occ	Difference	Party+high occ	Party+high occ	Difference	
Mean of five trust measures	4.41	4.28	0.13	4.38	4.43	-0.05	0.17
Sum of five trust measures	21.72	21.36	0.36	21.77	22.15	-0.39	0.75
Dummy for males	0.49	0.47	0.02	0.49	0.51	-0.02	0.04
Dummy for CCP member	0.16	0.29	-0.13***	0.16	0.24	-0.08**	-0.05
Age	56.82	56.12	0.70**	45.55	45.87	-0.32	1.024***
Dummy for married	0.83	0.80	0.03	0.81	0.84	-0.03	0.06
Years of schooling	9.02	10.47	-1.45***	10.58	12.33	-1.75***	0.30
Life satisfaction score	3.38	3.42	-0.04	3.21	3.22	-0.01	-0.03
Father years of schooling	3.64	5.92	-2.28***	5.90	7.31	-1.41***	-0.88
Father CCP member	0.16	1.00	-0.84***	0.23	1.00	-0.76***	-0.07
Father is cadres/intellectual	0.04	1.00	-0.96***	0.04	1.00	-0.96***	0.01
Father age	73.38	77.93	-4.54*	68.53	72.02	-3.48	-1.06
Mother years of schooling	1.49	2.64	-1.15***	3.83	4.55	-0.72	-0.43
Mother CCP member	0.03	0.17	-0.14***	0.04	0.17	-0.13***	-0.02
No. of obs.	1785	160		1072	107		

Notes: Authors' own calculations.

Table 4: Selected Estimated Results from Equation 1

	Trusting (% sent)	Trustworthy (% returned)	Risk averssion	Competition
	(1)	(2)	(3)	(4)
		Panel A: Non-Linear Estimation: Marginal Effects		
CR intensity (P & G)	-0.025**	-0.008	-0.260	-0.066**
	[0.012]	[0.005]	[0.191]	[0.031]
Risk aversion	-0.010***			
	[0.003]			
log amount received from player 1		0.087***		
		[0.011]		
Log monthly income	-0.047	0.006	-0.225	0.064
	[0.029]	[0.015]	[0.540]	[0.064]
Dummy for males	0.057*	0.035*	-0.486	-0.020
	[0.031]	[0.021]	[0.519]	[0.067]
Dummy for birth year 1966	0.048	0.010	0.302	-0.000
	[0.034]	[0.020]	[0.642]	[0.087]
Dummy for birth year 1977	0.022	0.016	0.658	-0.023
	[0.041]	[0.024]	[0.53]	[0.112]
Years of schooling	0.004	-0.001	0.139	0.010
	[0.005]	[0.003]	[0.107]	[0.013]
IQ score	0.004	-0.004	-0.038	0.024
	[0.007]	[0.004]	[0.106]	[0.015]
Personality controls	Yes	Yes	Yes	Yes
Parental and family controls	Yes	Yes	Yes	Yes
Experimental setting controls	Yes	Yes	Yes	Yes
Other controls for competition game	No	No	No	Yes
No. of obs.	310	307	310	309
		Panel B: OLS Estimation with CR measure as Panel A		
CR Intensity (P & G)	-0.024**	-0.012**	-0.220	-0.050**
	[0.012]	[0.006]	[0.189]	[0.021]
Observations	310	307	310	309
Adj. R-squared	0.028	0.131	-0.004	0.110
		Panel C: OLS Estimation with alternative CR intensity		
Adjusted CR Intensity (P & G)	-0.018*	-0.008	-0.216	-0.033
	[0.010]	[0.005]	[0.156]	[0.021]
Observations	310	307	310	309
Adj. R-squared	0.026	0.129	-0.003	0.106
		Panel D: OLS Estimation with additional parental controls		
CR Intensity (P & G)	-0.029**	-0.013*	-0.375*	-0.047**
	[0.013]	[0.007]	[0.200]	[0.023]
Observations	309	306	309	308
Adj. R-squared	0.030	0.118	0.043	0.125

Notes: Standard errors in brackets; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Personality controls include Big 5 personality traits and dummy for optimistic; Parental and family controls include mother's years of schooling, father's age, dummy for father being a party member, and number of siblings; Experimental control includes the date of the experiment, whether it was a single sex or mixed sex session, and number of people in the session. All the control variables are included in the regressions for Panels B, C, and D as well. The additional parental controls added in Panel D include father's years of schooling, dummy for mother being party member, father's detailed occupation, and both mother and father's class of origins.

Table 5: Searching for Channels: Results from Equation 2

	Trusting (% sent) (1)	Trustworthy (% returned) (2)	Risk averssion (3)	Competition (4)
Panel A: Combine parents/grandparents & interact with no GP contact				
CR intensity (P & G)	-0.029**	-0.011*	-0.279	-0.060***
	[0.012]	[0.006]	[0.198]	[0.021]
CR intensity (G) * No Contact w/t G	0.172**	-0.015	2.234	0.169
	[0.079]	[0.055]	[1.394]	[0.165]
No Contact w/t Parents	-0.014	0.007	0.998*	-0.077
	[0.034]	[0.017]	[0.548]	[0.065]
No Contact w/t Grandparents	0.047*	-0.009	-0.461	0.031
	[0.028]	[0.018]	[0.483]	[0.057]
$\beta_1+\beta_2$	0.143*	-0.026	1.955	0.109
P-Value	(0.065)	(0.632)	(0.159)	(0.509)
Observations	310	307	310	309
R-squared	0.120	0.196	0.103	0.1821
Panel B: Combine parents/grandparents & interact with no P & GP contact				
CR intensity (P & G)	-0.030**	-0.011**	-0.282	-0.059***
	[0.012]	[0.006]	[0.198]	[0.021]
CR intensity (G) * No Contact w/t P or G	0.146**	-0.018	1.781	0.155
	[0.072]	[0.050]	[1.294]	[0.151]
No Contact w/t P & G	-0.013	0.006	-0.153	0.009
	[0.027]	[0.018]	[0.466]	[0.054]
$\beta_1+\beta_2$	0.116*	-0.029	1.499	0.096
P-Value	(0.094)	(0.557)	(0.241)	(0.523)
Observations	310	307	310	309
R-squared	0.111	0.195	0.092	0.177

Notes: Standard errors in brackets; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Both panels include full sets of controls included in Table 4. In addition, in Panel A the dummy variables for 'no contract with parents' and 'no contract with grandparents' are included, while in Panel B the dummy for 'no contact with either parents or grandparents' is included.

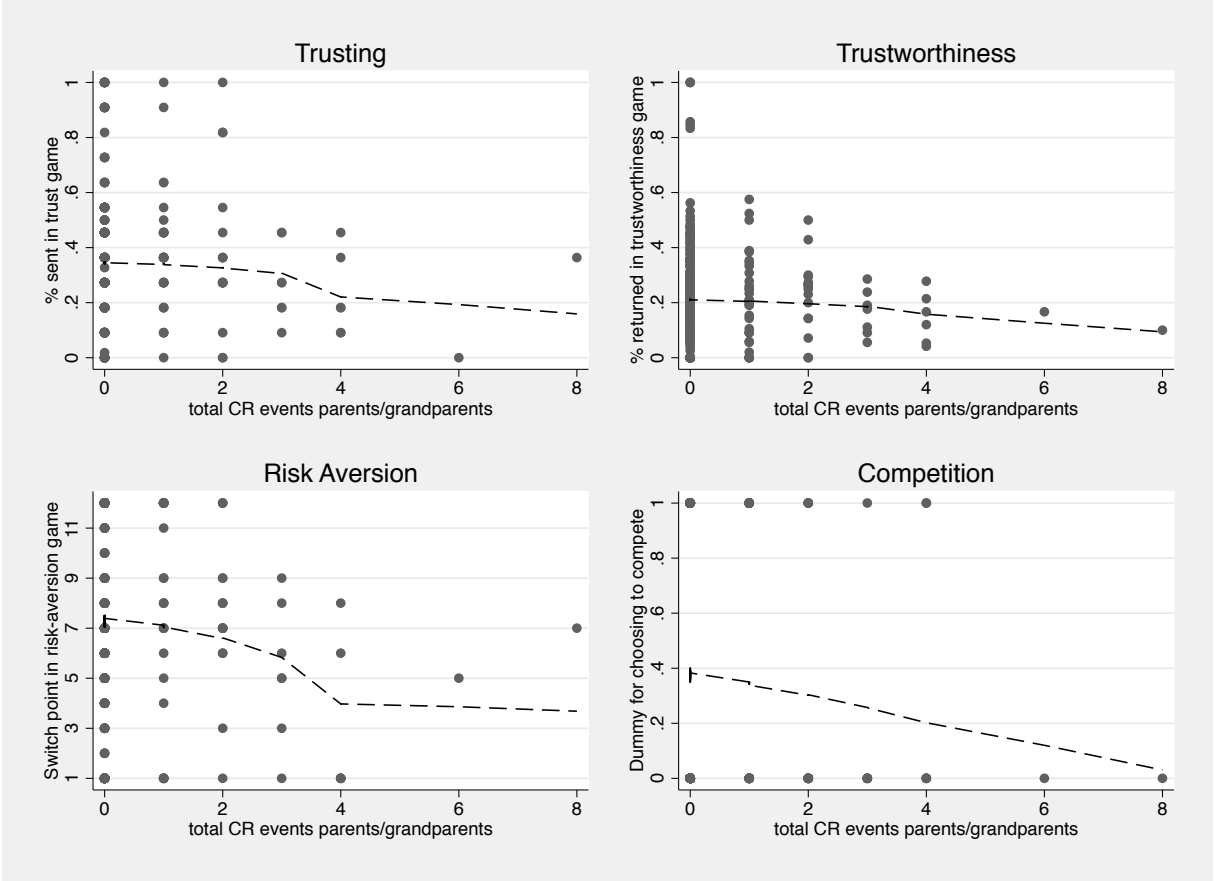
Table 6: Regression Results on Self-Reported Trust: Equation 3

	CR cohort (1948-61)			Non-CR cohort (1962-70)			Combined Two Cohorts		
	5 Category		Dummy	5 Category		Dummy	5 Category		Dummy
	OLS	O-Probit	OLS	OLS	O-Probit	OLS	OLS	O-Probit	OLS
Panel A: CGSS 2003	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Father CR occ*Father CCP mber	-0.450**	-0.832**	-0.158**	0.083	0.170	0.050	0.074	0.123	0.053
	[0.222]	[0.372]	[0.078]	[0.210]	[0.372]	[0.055]	[0.209]	[0.376]	[0.053]
F_CR occ*F_CCP* CR Cohort							-0.507*	-0.914*	-0.205**
							[0.306]	[0.527]	[0.095]
Observations	957	957	957	716	716	716	1,673	1,673	1,673
R-squared	0.206		0.156	0.230		0.222	0.205		0.175
	CR cohort (1948-61)			Non-CR cohort (1962-70)			Combined Two Cohorts		
	Mean Trust		Sum Trust	Mean Trust		Sum Trust	Mean Trust		Sum Trust
Panel B: CFPS 2012	OLS	O-Probit	OLS	OLS	O-Probit	OLS	OLS	O-Probit	OLS
Father CR occ*Father CCP mber	-0.370	-0.280*	-1.630	0.035	0.046	-0.162	0.040	0.039	0.224
	[0.233]	[0.165]	[1.141]	[0.346]	[0.243]	[0.405]	[0.339]	[0.239]	[1.697]
F_high occ*F_CCP* CR Cohort							-0.393	-0.307	-1.775
							[0.413]	[0.291]	[2.052]
Observations	1,945	1,945	1,945	1,179	1,179	1,179	3,124	3,124	3,124
R-squared	0.184		0.187	0.217		0.217	0.192		0.193

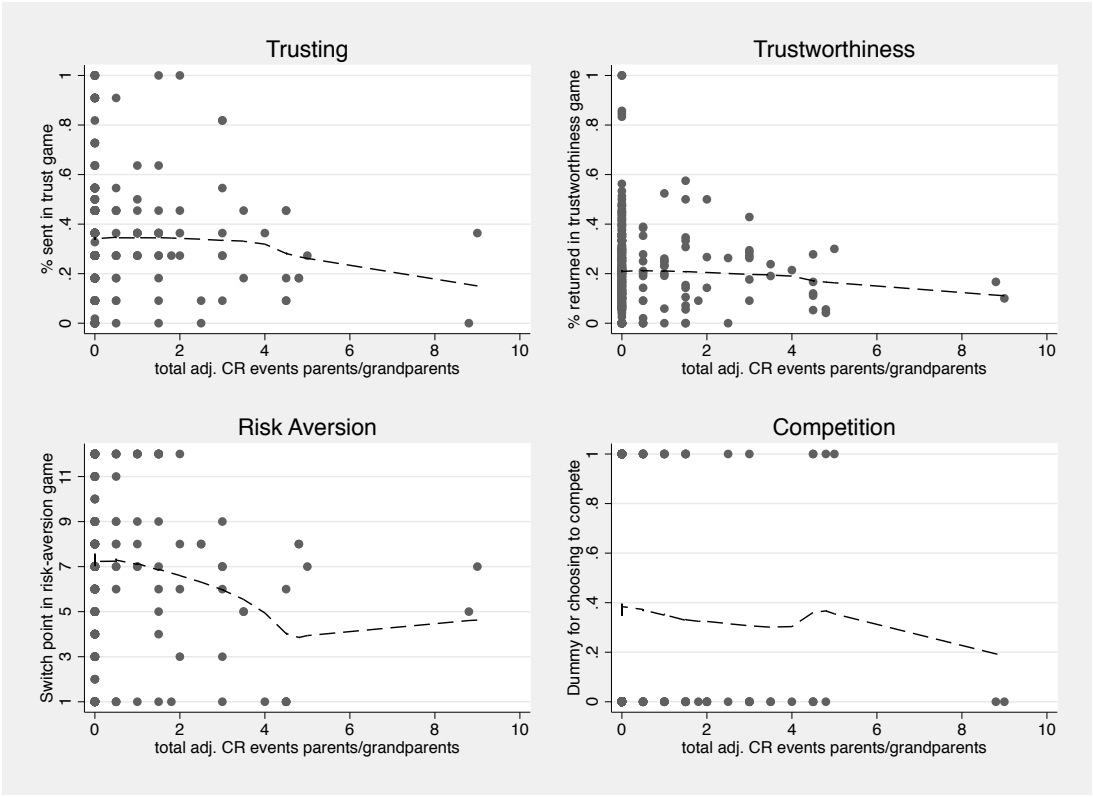
Notes: The additional independent variables include individuals' age, education, gender, dummy for being married, job or life satisfaction; fathers' occupation (other than those included in 'father's CR occ', which is the dummy variable for being in the occupation which was likely to be mistreated during the CR), education, age, mother's education and party membership and county fixed effects.

Figure 1: Father's Age Distribution at the Start of the CR (by cohort)

Figure 2: Unconditional Relationship btw Behavioural Traits and Intensity of CR Effect



A Appendix: Unconditional Relationship btw Behavioural Traits and Adjusted CR Intensity



B Appendix: Experiment Protocols

B.1 General Instruction for Participants

Thanks for coming. In front of you there are an outline of this experiment, a detailed instruction of task 1, a participant information sheet, one consent form, and a piece of paper which contains your participant number (ID Number) in this experiment. Please do not loss this last piece of paper as you will need to present it together with the ID Number to the cashier at the end of the experiment in order to receive your payment. Do not show this ID Number to anyone or allow it to be visible to anyone during or after this experiment.

First, please have a look at the participant information. If you have any questions or concerns about this participant information, please raise your hand. You can sign the consent form if you have no further concerns about the participant information. If you are not comfortable with the information disclosed in the participant information, you can leave immediately. You will still get 75 yuan participation fee if you decide to leave now. But you will not entail to any further payment.

As part of today's experiment, we will be performing 3 tasks and only one task will be paid. The funding for this research has been provided Australian Research Council and Australian National University. At the end of all the tasks I will randomly choose a participant to draw a ball from a bag containing three balls in front of you to determine which task you will be paid for. After finish all experimental tasks and the exist survey, you will be paid by cash for whatever amount you have earned in the selected task. Notice, the different tasks are independent in the sense that the decisions you make in one will have no impact on your outcome in the other.

We are about to begin the first task. Please listen carefully. It is important that you understand the rules of the task properly. If you do not understand, you will not be able to participate effectively. We will explain the task and go through some examples together. There is to be no talking or discussion of the task amongst you. There will be opportunities to ask questions to be sure that you understand how to perform each task. At any time whilst you are waiting during this experiment, please wait at your seat and do not do anything unless instructed by the experimenter. Also do not look at others'responses at any time during this experiment. If at any time you decide that you are not happy with the task you have been invited to perform, you can decide not to participate.

After we have completed all the tasks, I would like you to answer some questions about yourself. Please take your time and answer honestly and as accurately as possible. You will not be identified and your survey answers will only be used for this experiment and will only be used by the researcher(s) involved in this project.

If you are ready, then we will proceed. Please turn the page and wait for my instruction.

B.2 Risk Game Instructions

We are about to begin the 1st task. How much you will be paid in this task depends on your own decision and your luck. No money will be given at this point. All actual payments will be decided at the end of the experiment as to whether this task will be chosen as the one that you will be paid for.

Please listen carefully to the instructions.

In this task, you need to answer 11 questions. For each question, you are given two choices, Choice A and Choice B. You can chose one of them. You have to determine whether you would like to be paid by option A or B.

There are two important rules in your choice you need to take notice:

First, you cannot chose Choice B first and then switch in subsequent questions to choice A.

Second, you cannot switch twice from Choice A to Choice B and then back to Choice A.

Therefore, for the 11 questions given to you, you can choose all A, or all B, or switching from A to B once.

Please Note, we are going to pay you one of the 3 tasks only. At the end of all tasks we will determine which task to be paid. If this task is chosen to be paid, we will do the following procedures to determine how much you will be paid.

Particularly, we will choose one person from the group to come up and to pick one ball from this bag, which has 11 exactly the same balls, but each has a different number on it. The number on the ball which is picked by that person will be the question for which we will pay you according to the answer you are given to that question.

For example, if number 10 were chosen, you will be paid according to your choice of the options. Because final payment of option B depends on the result of a flip of coin. We will ask the chosen participants who draw the ball to flip a coin.

If your answer to question number 10 was A, you will be paid 101 yuan. Otherwise, if your answer was B, then we will pay you 441 yuan if coin shows head. We will pay you 0 yuan if you your choice was option B and coin shows tail. Do you have any questions? If you are ready, we will proceed. Please answer the 11 questions in the form in front of you. When you finish, please fold your answer sheet to ensure the anonymity of your answers. Then raise your hand, we will collect the answer sheet from you.

Figure B.1: Risk Game Choices

ID #: _____

Task1 Answer Sheet

#	A	B	Your Choice (A or B)
1	You get 101 yuan	if coin shows head, you get 135 yuan if coin shows tail, you get 0 yuan	
2	You get 101 yuan	if coin shows head, you get 169 yuan if coin shows tail, you get 0 yuan	
3	You get 101 yuan	if coin shows head, you get 203 yuan if coin shows tail, you get 0 yuan	
4	You get 101 yuan	if coin shows head, you get 237 yuan if coin shows tail, you get 0 yuan	
5	You get 101 yuan	if coin shows head, you get 271 yuan if coin shows tail, you get 0 yuan	
6	You get 101 yuan	if coin shows head, you get 305 yuan if coin shows tail, you get 0 yuan	
7	You get 101 yuan	if coin shows head, you get 339 yuan if coin shows tail, you get 0 yuan	
8	You get 101 yuan	if coin shows head, you get 373 yuan if coin shows tail, you get 0 yuan	
9	You get 101 yuan	if coin shows head, you get 407 yuan if coin shows tail, you get 0 yuan	
10	You get 101 yuan	if coin shows head, you get 441 yuan if coin shows tail, you get 0 yuan	
11	You get 101 yuan	if coin shows head, you get 475 yuan if coin shows tail, you get 0 yuan	

When you finish，please raise your hand. Please fold this answer sheet and make sure no one can see your answer. We then collect this answer sheet from you

【Please make sure this answer sheet has been folded when collecting】

B.3 Trust Game Instructions

We are about to begin the 2nd task. Your earning in this task depends on your choice as well as your luck. Please listen carefully to the instructions.

This task is performed by pairs of individuals. Each pair is made up of a Player A and a Player B.

At the beginning of this task, we will give each Player A 110 yuan hypothetical money. No real cash will be given at this point. All actual payments will be made at the end of the experiment if this task is chosen as the one that you will be paid for.

Each Player A will have the opportunity to keep all of 110 yaun to him/herself or allocate some or all of it to a Player B. Note that each dollar that Player A sends to Player B will be tripled by the experimenter and then given to player B.

Player B will then have an opportunity to keep all of the money sent to him/her by Player A and multiplied three times by the experimenter or to send some or all of it back to Player A. This time the money will not be tripled again. The experiment ends at this point.

Player B takes home whatever money that he/she does not give to Player A. Player A takes home whatever he/she did not give to Player B in the first round and whatever money Player B gave back.

Here are 2 examples:

1) Say Player A gives Player B 30 yuan (keep 80 yuan for himself/herself). This will be tripled and it will be 90 yuan when it reaches Player B. Then Player B sends back to Player 40 yuan. As a result, Player A will have 120 yuan (110 yuan minus the 30 yuan sent to Player B and plus the 40 yuan sent back by Player B). Player B will have 50 yaun (90 yuan received from the Player A (30X3) minus the 40 yaun sent back to Player A).

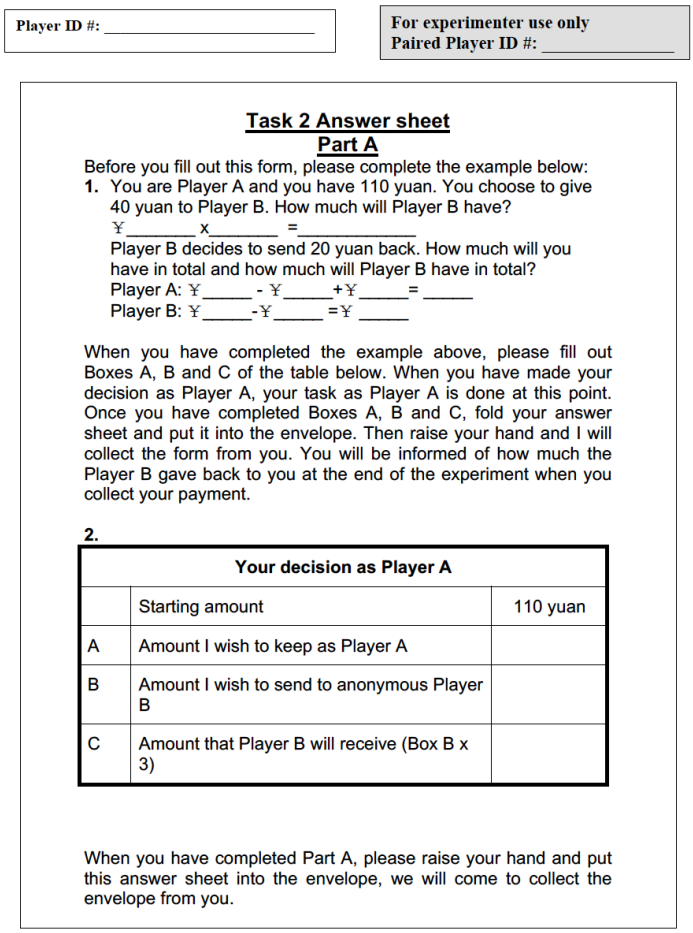
2) Say Player A gives Player B 40 yuan (keep 70 yuan for himself/herself). This will be tripled and it will be 120 yuan when it reaches Player B. Then Player B sends back to Player 60 yuan. As a result, Player A will have 130 yuan (110 yuan minus the 40 yuan sent to Player B and plus the 60 yuan sent back by Player B). Player B will have 60 yaun (120 yuan received from Player A (40X3) minus the 60 yaun sent back to Player A).

Note that these are only examples. The actual decisions as to how much to sent as Player A and how much to return as Player B are your own decisions.

Each of you will play as both Player A and Player B in this task. Each of you will be paired anonymously with two different people. In one pair you will be Player A and in the other pair you will be Player B. So you will play this task once as Player A and once as Player B. The important thing to remember is that you will NOT be paired with the same person twice and you will always remain anonymous to each other. No-one will be told who they are paired with. If this task is chosen for payment, I will then toss a coin to determine which pairing you will be paid for. So there is 50% chance that you will go home with what you kept as Player A and 50% chance you will go home with what you earned as Player B.

Are there any questions? If you are ready, we will proceed. You will convey your decisions using the answer sheet provided. Please fill in your ID number first. I will now read through an exercise question first. Please do not write anything until instructed to.

Figure B.2: Trust Game Player A's Choice



Player ID #: _____

For experimenter use only
Paired Player ID #: _____

Task 2 Answer sheet
Part A

Before you fill out this form, please complete the example below:

1. You are Player A and you have 110 yuan. You choose to give 40 yuan to Player B. How much will Player B have?
   ¥_____ x_____ =_____
   Player B decides to send 20 yuan back. How much will you have in total and how much will Player B have in total?
   Player A: ¥_____ - ¥_____+¥_____= _____
   Player B: ¥_____-¥_____ =¥ _____

When you have completed the example above, please fill out Boxes A, B and C of the table below. When you have made your decision as Player A, your task as Player A is done at this point. Once you have completed Boxes A, B and C, fold your answer sheet and put it into the envelope. Then raise your hand and I will collect the form from you. You will be informed of how much the Player B gave back to you at the end of the experiment when you collect your payment.

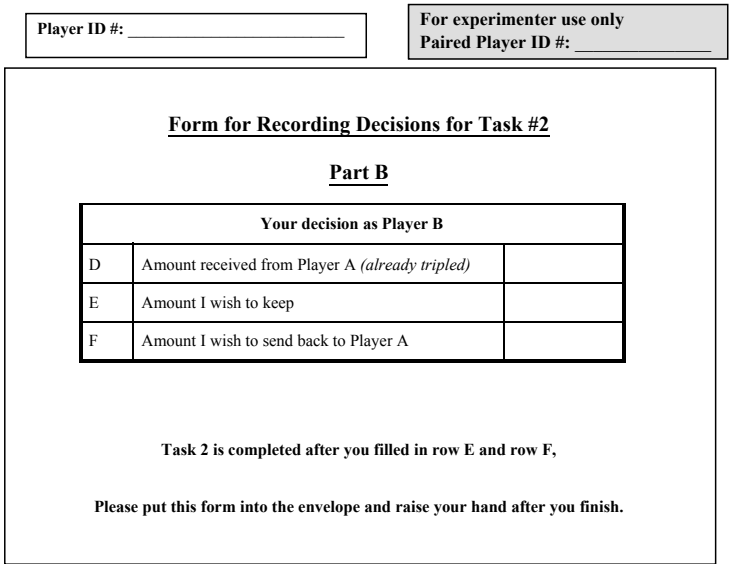
2.

Your decision as Player A		
	Starting amount	110 yuan
A	Amount I wish to keep as Player A	
B	Amount I wish to send to anonymous Player B	
C	Amount that Player B will receive (Box B x 3)	

When you have completed Part A, please raise your hand and put this answer sheet into the envelope, we will come to collect the envelope from you.

You will now play Player B in the second round of this game. Here is the Answering Sheet for Player B. We have collected everybody's answer sheet for the first round of the game when you played Player A?and have filled in the amount that your partner sent to you times 3 on D Row of answer sheet Part B. Note that this amount is the amount Player A sent to you times 3. So it has already be tripled. Please put your answer to this part of the game in Rows E and F.

Figure B.3: Trust Game Player B's Choice



Player ID #: _____

For experimenter use only
Paired Player ID #: _____

Form for Recording Decisions for Task #2

Part B

Your decision as Player B		
D	Amount received from Player A *(already tripled)*	
E	Amount I wish to keep	
F	Amount I wish to send back to Player A	

Task 2 is completed after you filled in row E and row F,

Please put this form into the envelope and raise your hand after you finish.

B.4 Competition Game Instructions

We are about to begin the 3rd task. This task has 3 rounds, in each round you are required to complete some add-up games. But the earning calculating methods are different from round to round.

Earning from this task depends on your decision, your performance and the performance of the participant you matched with. Please listen carefully.

If this task is chosen to be paid at the end of this experiment. I will draw one ball from a bag containing 3 balls which are exactly the same but with different number on it. The number on the ball we draw out tell us which round we are going to pay.

Notice that because each round has the same chance of been chosen as payment round, you should try your best and treat each round separately to maximize your possible earnings.

First let's have a look at the add-up game.

In add-up game, you need to calculate the sum of 5 random numbers. For example:

22	17	83	61	49	Answer here

In each round, you will be given 5 minutes. You need to work out the sum of the add-up games given and record your answer on the last column. In 5 minutes time, you need to complete add-up games given to you one by one and try your best to complete as many as possible add-up games. You cannot use a calculator (including calculators on you phone). Your performance in each is secrete to others.

There will be two methods to calculate your payoffs in three rounds:

Method of payoff calculation No. 1:

In five minutes, you will earn 12 yuan for each add-up game you correctly completed. No punishment for wrong answers.

Method of payoff calculation No.2:

You will be randomly paired with someone in this room. Your earnings depends on your performance and the performance of the participant you paired with. If you correctly complete more add-up games than your partner, you can get 24 yuan for each add-up game you completed in 5 minutes. If your partner and you complete exactly the same number of add-up games in 5 minutes, you will get 12 yuan for each add-up game you correctly completed. If you complete less add-up games than your partner in 5 minutes, you will get nothing.
The following are 2 examples: For the method No.1: if you complete 10 questions correctly, you will earn 1012 yuan=120 yuan

For the method no.2: if you complete 10 questions correctly, your partner complete 9 questions correctly. You will earn 1024 yuan=240 yuan

Rules for 1st Round:
Now I am going to explain the rules for first round.

In the first round, your earning will be calculated according to payoff calculation method No. 1. You have 5 minutes to complete add-up games as many as possible. If this round is selected to be paid, every add-up question you correctly complete within 5 minutes will earn you 12 yuan. There will be no punishment for any wrong answers.

Any Questions?

Now I will hand out Task 3 round 1 Answer Sheet. Please fill in your ID number first once you get the answer sheet.

Rules for 2nd Round:
Now I will introduce round two.

In this round, your earning is determined by payoff calculation method No. 2. You have 5 minutes to complete add-up questions as many as possible. You will be randomly paired with someone in this room. Your earnings depends on your performance and the performance of the participant you are paired with. If you correctly complete more add-up questions than your partner, you can get 24 yuan for each add-up game you completed in 5 minutes. If your partner and you complete exactly the same number of questions in 5 minutes, you will get 12

yuan for each question you correctly completed. If you complete less than your partner in 5 minutes, you will get nothing.

Any Questions?

Now I will hand out Task 3 round 2 Answer Sheet. Please fill in your ID number first once you get the answer sheet.

Rules for 3rd Round:

Now I will introduce round three.

In this round, you will have 5 minutes to solve the sum-up problems. In addition, you have a chance to choose whether to be paid by the payoff calculation method No. 1 or payoff calculation method No. 2. If you choose to be paid by payoff calculation method No. 1 and this round is chosen to be paid, you will earn 12 yuan for each add-up question you correctly completed within the five minutes. No punishment for wrong answers. If you choose to be paid by payoff calculation method No. 2, you will be randomly paired with someone in this room. Your earnings depends on your performance in this round and the performance of your counterpart in Round 2. If you correctly complete more add-up questions than your partner, you can get 24 yuan for each add-up game you completed in 5 minutes. If your partner and you complete exactly the same number of questions in 5 minutes, you will get 12 yuan for each add-up game you correctly completed. If you complete less than your partner in 5 minutes, you will get nothing. Therefore, if this round is chosen to be paid, your earning will be calculated by your choice.

Any Questions?

Now I will hand out Task 3 round 3 Answer Sheet. Please fill in your ID number first once you get the answer sheet.