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Luck or cheating? A field experiment on honesty with children

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ABSTRACT

We run an experiment to study the relationship between honesty, age and self-control. We focus on children aged between 5 and 15 as the literature suggests that self-control develops within such age range. We ask each child to toss a fair coin in private and to record the outcome (white or black) on a paper sheet. We only reward children who report white. Although we are unable to tell whether each child was honest or not, we speculate about the proportion of reported white outcomes. Children report the prize-winning outcome at rates statistically above 50% but below 100%. Moreover, the probability of cheating is uniform across groups based on child's characteristics, in particular age. In a second treatment we explicitly tell children not to cheat. This request has a dampening effect on their tendency to over-report the prize-winning outcome, especially in girls. Furthermore, while this effect in boys is constant with age, in girls it tends to decrease with age.

1. Introduction

In everyday life we often observe dishonesty: people ride the bus without buying a ticket, they evade taxes and illegally download music from the Internet. In an effort to limit dishonesty, bus companies hire ticket checkers, governments apply fiscal inspections and music companies are in contention with popular file sharing applications. We ourselves lock our front doors and secure our bicycles to prevent theft. Clearly, being unable to trust others' behavior bears substantial economic and social costs. Mazar and Ariely (2006) argue that dishonest actions "contribute to the US economy losing hundreds of millions of dollars in tax revenues, wages, and investment dollars, as well as hundreds of thousands of jobs each year" . For this purpose, investigating the determinants of dishonest behavior is a main issue in social sciences.

An extensive experimental literature studies dishonesty in Psychology (see, e.g., Polak & Harris, 1999; Wilson, Smith, & Ross, 2003) and Economics (see, e.g., Gneezy, 2005; Mazar, Amir, & Ariely, 2008; Wenzel, 2005) . More recently, also Neuroscience has shown attention to this topic (e.g., Greene & Paxton, 2009). Our paper contributes to this debate investigating the determinants of honest behavior and, specifically, the role played by age and self-control.

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For this purpose, we report data from a field experiment where the participants have a deliberate incentive to cheat. In our experiment subjects tossed a fair coin, white on one side and black on the other, and recorded the result on a paper sheet. They earned a prize from this one-shot task only if they reported the white outcome. Since the coin was tossed privately, our subjects had an intentional incentive to record the prize-winning side of the coin regardless of the true outcome of the toss.[1] Although we cannot detect whether each subject was honest, we are able to study the honesty of groups with homogeneous characteristics, comparing the observed outcome with the equal distribution between white and black outcomes implied by the fair coin.

In our experiment, subjects are children aged from 5 to 15 attending an Italian summer camp.[2] This design and this specific subject pool allow us to test the effect of age and self-control on the probability of cheating. In fact, it is well established that substantial improvements in self-control occur between the ages of 8 and 10 (see, e.g., Mischel & Metzner, 1962). Therefore, if self-control exertion plays a role for honest behavior we should observe older children (i.e., those with more self-control) to overcome their instinct to cheat. In contrast, if self-control exertion does not play a role, the probability of cheating should not vary significantly with age.

In addition, our design consists of two treatments: in the first (Control Treatment, CT) we do not mention the possibility of cheating; in the second (Request Treatment, RT) we explicitly request that the children refrain from cheating (similarly to Mazar et al., 2008, in a different context). The purpose of RT is to study the effect of a non-binding request on the probability of reporting the prize-winning side of the coin.

Our findings, reported in Table 2, can be summarized as follows: First, children report the prize-winning outcome at rates statistically above 50% but also statistically below 100%. The probability of cheating is uniform across the child's characteristics, in particular age. Our interpretation is that the age development of self-control does not affect the probability of cheating. Second, requesting children not to cheat has the effect of reducing by 16% the fraction of those who report the prize-winning outcome. Third, the effect of the request differs significantly with gender. While for boys the effect of the request remains unchanged with age, it tends to reduce for girls. In particular, the request has a larger effect on girls than boys only if they are younger than 11.

The paper is organized as follows: in Section 2 we sketch the experiment. In Section 3 we present our findings and in Section 4 we draw our conclusions. A supplementary note provides details on the summer camp and the tasks we performed before, during and after the experiment.

2. The experiment

The experiment is part of a battery of experiments we conducted in the CUS Summer Camp of Padua (Italy) during two days in July 2008. There are at least three reasons that make the summer camp an ideal environment where running this experiment. First and foremost, children in the summer camp are used to spending their time following a number of different instructors and doing various (often even bizarre) leisure-time activities. Hence, they do not perceive our experiment differently from typical camp activities. Second, a summer camp allows us to easily gather children of various ages (from 5 to 15) and with different backgrounds. Third, enrollment in the summer camp is based on a weekly schedule; most of the children meet for the first time on Monday and, therefore, peer effects are minimal.

The experiment took place outdoors, in different time slots between 9:00am and 5:30pm. In the analysis we explained the rules individually to each child, to ensure they had a full understanding before playing. We asked each of them to step behind a wall, toss a fair coin that was white on one side and black on the other, and to report the result of this one-shot task on a sheet of paper.[3] Only children who reported white received a prize corresponding to five tokens.[4] These tokens could be exchanged at the clubhouse of the summer camp after the experiment and in presence of an adult. To make the prize more concrete, with the children we used examples of what they could get with five tokens: for instance, an ice-cream, 10 candies or a can of soda. However, children were aware that at the clubhouse they could have the prize they preferred within a broad menu of alternatives. This was done to have an experimental currency desirable for all of them. We avoided any explicit reference to monetary values for two reasons: first, the youngest children are likely not to know its value; second, it has been shown that dishonest decisions are less frequent when money is used as currency (for a review see Ariely, 2008, chap. 12). Privately, we paid the summer camp 10 euro cents for each token won by the children; this roughly corresponds to the monetary value of the prize. However, children were not aware of this.

Since children were not observed during their toss, they could easily cheat and report the white outcome even if the result of their toss was black. Although we are unable to detect whether each child was honest, we can estimate the honesty of

[1] In our experiment, children either tell the truth or lie. For sake of clarity we do not permit a mixed behavior as in Mazar et al. (2008), where individuals are allowed to lie 'a little'.

[2] The behavior of children is increasingly being studied in different situations, with a growing body of literature in experimental economics having emerged over the last few years (see for instance Fehr, Bernhard, & Rockenbachk, 2008; Harbaugh, Krause, & Berry, 2001; Harbaugh, Krause, & Vesterlund, 2007; Sutter, 2007).

[3] Our experimental design is similar to Fischbacher and Heusi (2008).

[4] Two weeks before the main experiment we ran a pilot experiment with around 40 children involved in another sport ground of the CUS Summer Camp of Padua. In that occasion, we were especially interested in testing our procedure, discovering whether children were willing to take part in the task, and which kind of questions they might raise. After receiving positive feedbacks on all these issues, we decided to implement the same design 2 weeks later in the main experiment.

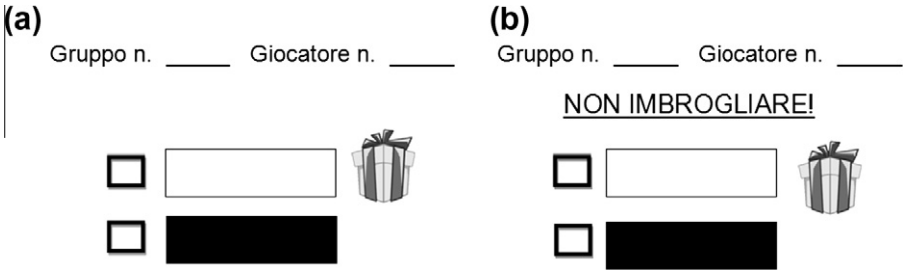

Fig. 1. Reporting sheet (a) in CT (left) and (b) in RT (right).

Table 1
Average sample statistics.

	CT	RT	Whole sample
Age	9.2593	8.5063	8.8875
Fraction of boys	0.7284	0.6962	0.7125
Fraction of only children	0.2593	0.2911	0.2750
Observations	81	79	160

groups of children with homogeneous characteristics, by comparing the observed fraction of reported white outcomes with the 50% expectation.

Our design consists of two treatments, conducted in two different days with different children. In the Control Treatment (CT), we carefully avoided mentioning the possibility of cheating but, at the same time, we did not explicitly tell the children not to cheat. In the Request Treatment (RT), we explicitly requested that they refrain from cheating. We did so both orally during the task explanation, and in writing, by adding the sentence 'DO NOT CHEAT!' ('NON IMBROGLIARE!' in Italian) to the reporting sheet. Children in the RT thus filled in reporting sheet (b) rather than (a) in Fig. 1.

A few days before the experiment we asked for informed consent from the parents of all the participants; 83.38% of the parents we contacted gave their consent; our final sample consists of 160 observations.[5] Overall, as detailed in Table 1, the samples from the two days are approximately equal in size and with similar demographic characteristics. In particular, the average age is between those ages in which self-control is believed to rise.

As Fig. 2 shows, the RT sample is slightly younger than the CT sample. The methodology we adopt below, however, allows us to understand the effect of RT conditional on the child's age.

3. Findings

Our findings can be summarized in three main results, the first of which is based on the Control Treatment:

Finding 1. *Many – but not all – children cheat. The tendency to cheat is uniform by age, gender, and number of siblings.*

In CT, 85.39% of the children reported the white outcome with a 95% binomial confidence interval of (76.32%, 91.99%). With a fair coin, one would expect the confidence interval to include 50% in a normal situation. However, in this setting it would be convenient to always report white since nobody verifies the result of the toss. The percentage in our sample is indeed statistically above 50%, but also statistically below 100%.

To provide a quantitative assessment of the relation between the probability of reporting white, age gender and the number of siblings, we run the probit regressions whose marginal effects are shown in Table 2. In all the specifications, the dependent variable takes a value 1 if the child reports the white outcome, and 0 otherwise.

In specification (1) we focus on the CT sample only. Here the dependent variable is regressed over age and control binary variables on gender and only children.[6] The variable on age is the child's integer age minus 8.[7] If children behaved uniformly honestly or dishonestly, we should not observe a significant effect of any variable in the regression. We indeed see that the child's variables do not explain the reported coin toss at conventional significance levels. In particular, the probability of report-

[5] We contacted 242 parents, and 203 gave their consent. In the second day of the experiment we excluded 12 children who had also participated in the first day. The size of the final dataset is reduced further because 9 children did not show up during either day, and we do not have complete information on the characteristics of 22 children.

[6] We include gender and only children as these variables are potentially relevant in defining a child's personality: the literature suggests that women follow a more ethical behavior than men (White, 1999), while a common stereotype describes only children as being more asocial and selfish than children raised with brothers and/or sisters. (Even though empirical research finds no evidence of this difference: see, e.g., Blake, 1981.)

[7] We adopt this subtraction to scale the marginal effects to the age in which self-control is believed to develop. The age is also the median age in our sample.

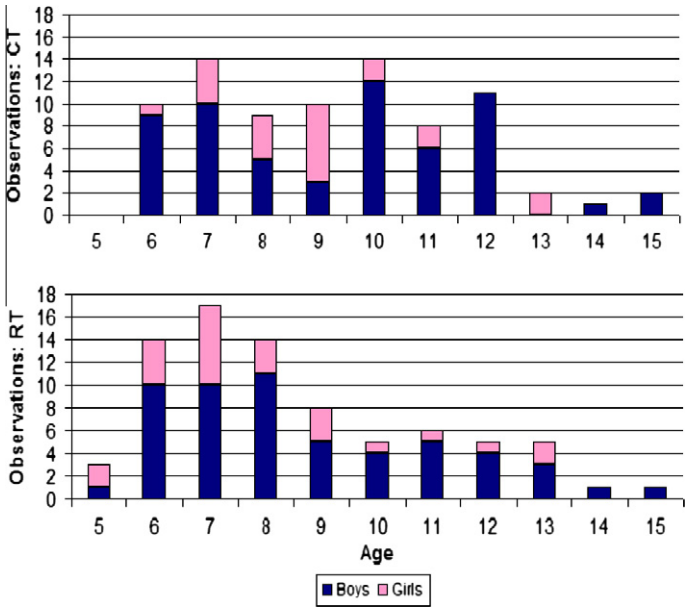

Fig. 2. Age distribution by gender in the CT and RT samples.

Table 2
Probability of reporting the white outcome.

Variable	(1)	(2)	(3)	(4)
Age-8	0.0084	0.0181	0.0114	0.0114
	(0.0147)	(0.0143)	(0.0198)	(0.0197)
Boy	−0.0725	0.0534	−0.1011	−0.1005
	(0.0688)	(0.0708)	(0.0964)	(0.0959)
Only children	−0.0834	−0.0839	−0.1093	−0.1088
	(0.0946)	(0.0775)	(0.1183)	(0.1179)
RT		−0.1619**	−0.3557***	−0.3476***
		(0.0655)	(0.1141)	(0.1200)
RT × (Age-8)			0.0095	
			(0.0281)	
RT × (Age-8) × Boy				−0.0092
				(0.0298)
RT × (Age-8) × (1-Boy)				0.0727*
				(0.0381)
RT × Boy			0.2234*	0.2205*
			(0.1106)	(0.1145)
RT × Only children			0.0291	0.0495
			(0.1328)	(0.1259)
No. of observations	81	160	160	160
Wald test	3.27	10.18**	16.50**	22.18***
(*p*-value)	(0.3521)	(0.0374)	(0.0209)	(0.0046)
Pseudo-R^2	0.0257	0.0675	0.0854	0.1040
Log-pseudolikelihood	−31.3522	−79.5505	−78.0220	−76.4359

ing white is statistically equal at different ages. This contrasts with the hypothesis that the age development of self-control skills affects the probability of cheating.

Then, we turn our attention on the effect of the RT.

Finding 2. *Requesting that children refrain from cheating significantly reduces the proportion of white outcomes reported.*

In specification (2) of Table 2 we consider both CT and RT samples. The dependent variable is regressed over the same variables as in specification (1), and in addition a binary variable capturing the RT effect. According to this specification, only the RT variable is significant at 5%; in particular, simply requesting that the children do not cheat reduces the probability of reporting white by 16.19%.

However, this finding may be biased by the assumption that the effect is identical in all the children. We then investigate this issue, obtaining the following finding:

Finding 3. *On average, the effect of the Request Treatment is stronger in girls than in boys, with girls reducing the probability of reporting white outcomes on average by 36%, as opposed to the 13% of boys. However, the effect tends to reduce with age in girls, whereas it is stable in boys.*

In specification (3) of Table 2 we add the interactions between RT and the child's characteristics. We find no evidence of a different treatment effect with respect to age, or only children, but the effect appears to be smaller among boys (significant at 10%). While the probability of reporting white with the RT is reduced by 35.57% for girls, it is reduced only by $35.57 - 22.34 = 13.23\%$ for boys. This finding is consistent with a branch of literature viewing women as being driven by more ethical concerns (see, e.g., White, 1999), and a more pronounced sense of guilt (Hoffman, 1975) that the treatment certainly emphasized.

In this specification, the interaction between age and RT is not significant at conventional levels. This suggests that the effect of RT is the same disregarding age. However, this result might hide a different age development with gender. To investigate this issue, in specification (4) of Table 2 we add the interactions between gender, age and RT. We still find no significant age development in boys. Indeed, their probability of reporting white is uniformly reduced by $34.76 - 22.05 = 12.71\%$. In contrast, RT has a smaller impact on girls as they grow older. The probability is reduced by $34.76 - 7.27(6 - 8) = 49.3\%$ in girls aged 6, and only $34.76 - 7.27(11 - 8) = 12.95\%$ in girls aged 11.[8] At this age the effect of RT is virtually the same in boys and girls.

4. Discussion

In this paper we study the relationship between honesty, age and self-control, focusing on a sample of children aged between 5 and 15 enrolled in an Italian summer camp. Our results show that, even from an early age, some children have an inclination to behave dishonestly when given the opportunity to do so. The fact that some children in our experiment reported the losing outcome also suggests that there may be an internal reward from being honest, as argued by Frank (1987), Levitt (2006). It seems however that most children do not receive such internal rewards; this evidence is consistent with the findings in Pruckner and Sausgruber (2008). Our data show that the probability of cheating is uniform across groups based on child's characteristics, in particular age.

Our analysis also suggests that a useful method to reduce dishonesty is simply to remind people to behave honestly. While this solution does not entirely remove the problem, it significantly reduces the probability of being dishonest, and it does so at virtually no cost, as it does not need to observe the actual behavior; a similar result is found with older subjects in recent works from Mazar et al. (2008). However, in our experiment, a reminder treatment is significantly more effective in females than in males. This finding suggests that girls are more prone to a moral suasion and it is consistent with Hoffman (1975) that shows moral transgressions in females are more likely to be associated with guilt. We find that the effect of the treatment tends to reduce with age in girls, whereas it is stable in boys.

Future research will run the same experiment with children from different countries, to investigate whether there are country-specific effects. It would also be interesting to study whether the cheating behavior of children is related to the behavior of their parents.

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Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.joep.2010.12.001.

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[8] It would be hard to take seriously the marginal effect at lower and higher ages, since our RT sample includes only girls aged between 5 and 13, and in the regression it is compared with the CT sample, for which we do not have data on girls aged 5 or 12 (see Fig. 2). In fact, we would obtain either a reduction of the probability higher than 50% or a counter-intuitive increase of the probability.

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