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journal homepage: www.elsevier.com/locate/jeboCheating, inequality aversion, and appealing to social norms[☆]Clara Amato^{a,b}, Francesca Gino^c, Natalia Montinari^{d,*}, Pierluigi Sacco^e^a Blekinge Center of Competence, County Council, Karlskrona, Blekinge, Sweden^b Network for Empowerment and Well-Being, Lyckeby, Sweden^c Harvard Business School, Negotiation, Organizations & Markets, Baker Library, Boston, MA 02163, United States^d Dipartimento di Scienze Economiche, Università degli Studi di Bologna, Piazza Scaravilli 2, 40126 Bologna, Italy^e IULM University, Via Carlo Bo, 1, 20143 Milano, Italy

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ABSTRACT

We conduct a field experiment involving 143, 9-years old children in their classrooms. Children are requested to flip a coin in private and receive a big or a small prize depending on the outcome they report. Comparing the actual and theoretical distribution of reported wins, we find evidence of cheating at the aggregate level. By using behavioral data gathered on previous and subsequent meetings with the same children, we are able to explore the relationship between cheating behavior, other regarding preferences, and the tendency to appeal to social norms in judging unfair behaviors. Children who are classified as concerned about inequality are less likely to cheat. Similarly, children who are more likely to appeal to social norms in judging unfair behaviors are also less likely to cheat. We find no significant relationship between inequality concern and social norms sensitivity, suggesting that these mechanisms work differently interacting with children moral behavior.

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1. Introduction

In recent years, the attitude to cheat is one of the most studied phenomena in behavioral and experimental economics (see, e.g. [Jacobsen et al., 2018](#); [Rosenbaum et al., 2014](#); [Gino, 2015](#); [Gino and Ariely, 2016](#)). In the attempt to understand why ordinary people lie in everyday life and whether some individual characteristics can predict the tendency to lie, several studies have focused on the behavior of children of different ages, evidencing two main results: (i) children of all ages cheat, with younger children exhibiting a stronger tendency toward cheating ([Buccioli and Piovesan, 2011](#); [Glätzle-Rützler and Lergetporer, 2015](#); and [Maggian and Villeval 2016](#)); (ii) around the age of 9 children fully understand the importance of appearing honest in front of adults ([Shaw et al., 2014](#)).

The tendency to cheat in young children can be considered as a constitutional aspect of their own cognitive and social development ([Talwar and Crossman, 2011](#)). As children are gradually exposed to the socialization process and to the inhibitory role of pro-social norms, they learn to modulate such tendency managing moral emotions ([Malti and Krettenauer, 2013](#)) and social imperatives ([Lee, 2013](#)), also by means of a rich menu of complex cultural cues such as expressive prosocial interactions ([Kirschner and Tomasello, 2010](#)) and fictional social observers ([Piazza et al., 2011](#)). Moreover, children manifest a tendency to police or report adult transgressors even when facing uncertainty about the consequences of their act ([Heyman](#)

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et al., 2016). Such prosocial capacities can be at least partially compromised by dysfunctional features of the social environment to which children are exposed (Koenig et al., 2004). Despite this articulate picture, however, our understanding of how children manage moral tradeoffs, and of the nature and role of the intervening factors that may influence their tendency to cheating vs. honesty in certain situations, is still partial and calls for further research.

In this study we analyze the relationship between cheating, inequality aversion and appealing to social norms in judging unfair behavior. While previous studies have investigated the relationship between cheating and other regarding preferences in children by looking at contexts where cheating imposes externalities on others (see e.g. Maggian and Villeval, 2016), to the best of our knowledge, no previous study has investigated it in contexts where cheating only affects the child's payoff with no consequences for others. Still, especially in these contexts, establishing links between factors such as other regarding concerns, social norms and cheating behavior may highlight the existence of interesting spillovers across different dimensions of moral reasoning.¹

We report results from a lab in the field experiment involving 143, 9-years old children in their classrooms. Children are requested to flip a coin in private and receive a big or a small prize depending on the outcome they report. Comparing the actual distribution of reported wins to the theoretical one we find evidence of cheating at the aggregate level. By using behavioral data gathered on previous and subsequent meetings with the same children, we investigate whether cheating is associated to two mechanisms: other regarding concerns and appealing to social norm in judging an unfair behavior. We find that both, children who exhibit other regarding concerns and children who are more likely to appeal to social norm in judging unfair behaviors are also less likely to cheat, while these two measures appear not to be correlated to each other. We suggest that the fact that experimental subjects give up cheating in a context where such cheating does not damage others but only influences own payoffs may be regarded as evidence of norm internalization.

We focus on 9 years old children (i.e., children in their third grade of primary school) because we know that at this age they are able to understand the trade-off between being fair and appearing fair in the eyes of others (Shaw et al., 2014). Furthermore, 9-years old children have already developed concerns for other individuals, such as inequality aversion (Fehr et al., 2008), and are also able to modify their behavior to adhere to norms of giving they stated in advance (Blake et al., 2015).

Few previous studies in economics have investigated children cheating behavior: by mean of a reported outcome resulting from a coin toss performed privately, Bucciol and Piovesan (2011) consider 5 to 15 years old children and find that most children cheat uniformly. However, a moral reminder about the importance of being honest, results in reducing their tendency to over-report the prize-winning outcome, especially in girls.

Glätzle-Rützler and Lergetporer (2015) comparing children aged 10/11 and 15/16 years show that the propensity to lie decreases with age, with this effect being driven by the fact that younger children lie more and that, overall, subjects lie less in order to decrease disadvantageous inequality.

Alan et al. (2018) study cheating behavior in a large sample of elementary school children in the context of a creative performance task, in the presence and absence of performance incentives. They find that children with higher IQ, higher socioeconomic status, and higher expectations on the part of their parents have a higher likelihood of cheating. They also find that altruistic students cheat significantly less in the presence of incentives.

Finally, and most related to our study, Maggian and Villeval (2016) elicit separately social preferences and cheating behavior of each individual by means of a simple game studying the association between preferences for cheating and preferences over allocation of payoffs. Differently than in our study where individual cheating behavior cannot be detected, Maggian and Villeval (2016) are able to measure cheating at the individual level. When looking at the other regarding preferences, they find that girls are more inequality averse than males. Moreover, children with stronger social preferences are found to display a lower tendency to cheat, even when lying would benefit others at no monetary cost.

Compared to these studies, our experiment attempt at providing a better understanding of children cheating behavior by exploring the association between cheating behavior in children and both (i) their inequality aversion and (ii) their appealing to social norms in judging unfair behaviors. While Maggian and Villeval (2016) explored the link between other regarding preferences and cheating in context where cheating may have consequences for others' payoffs, we investigated whether this link persists even with intrinsic cheating that have no costs or advantages for others. Moreover, we add to this picture the role of the social norm by analyzing the effect of being sensitive to it on intrinsic cheating behavior. Other regarding concerns and appealing to social norms are two distinct mechanisms affecting moral reasoning, still little is known about whether they are mutually reinforcing or whether they affect the moral reasoning in an independent way.

Our results suggest that the children willingness to cheat can be explained by individual differences in exhibiting other regarding preferences as well as in the tendency to appeal to social norm. Moreover, these two mechanisms are not found to be correlated, suggesting the existence of two independent channels interacting with the children moral reasoning that affect cheating behavior.

The rest of the paper is organized as follows: Section 2 presents the experimental design and the participants; Section 3 illustrates our research hypothesis; Section 4 presents our results and Section 5 concludes.

¹ Two studies investigate this relationship with a subject pool of university students and finding opposite results. Kerschbamer et al. (2017) find that altruists cheat less when cheating imposes a negative externality on others, but they do not find any evidence in support of the hypothesis that altruists are more (or less) averse to cheating than others in environments where cheating has no impact on others' payoffs. Cappelen et al. (2013) find that subjects who give higher shares in the dictator game show also a higher degree of lying aversion in the sender-receiver game.

2. The experiment

In this section we describe our experimental procedures.

Participants. Our participants were 143 children (67 females), 8 to 10 years old ($M = 9.02$ years, $SD = 0.21$ years), whose parents gave written consent for their participation in our experiment. These children were enrolled in 9 classes across 3 primary schools in the district of Lucca (Italy).²

Procedure. About one week before the first session of the experiment, we distributed to children's parents (or legal guardians) a flyer with a description of our study and a consent form that they had to sign if they agreed their child(ren) to participate in it. In addition, we asked parents to answer a questionnaire in which we asked about (1) the family; (2) their child's extra school activities; and (3) their personality traits. Parents could refuse to answer all or part of this questionnaire. The questionnaire had no personally identifying information, only a randomly assigned ID that was also used in the subsequent weeks to identify the child.

Our study was conducted in six sessions over 5 months, from January to May 2017 during school hours and in presence of a teacher.³ In this paper we focus (i) on a cheating game (CG henceforth) and on a binary dictator game (BDG henceforth) performed in the second meeting (February 2017); and (ii) on the sensitivity to social norm (SM henceforth) in judging an unkind behavior conducted in the fourth meeting (April 2017).

The *cheating game* follows the experimental design by [Buccioli and Piovesan \(2011\)](#) with small changes and it does not vary with respect to treatments. First the experimenter explained the game to all children in their class, ensuring they had a full understanding of the task they were going to face before playing.⁴ Then each child was asked to leave the classroom, privately 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 report sheet.⁵ When entering again the classroom the child gave the report sheet to the experimenter who prepared the envelopes with the tokens corresponding to the payment. Children were informed that payments occurred in private at the end of the experimental session and children were given the possibility to exchange all the tokens gained in that experimental session with small toys and school materials in an experimental shop.

Children who reported white received a prize corresponding to four tokens, while those reporting black only got one token.⁶ Since children were not observed during their toss, they could 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 groups of children with homogeneous characteristics, by comparing the observed fraction of reported white outcomes with the 50% expectation.

In each class, the *binary dictator game* was performed after the CG. We implement the same design as in [Fehr et al. \(2008\)](#): each child had to take four decision each about the allocation of tokens between himself and/or another anonymous child from the same school and age but not participating to the experiment. In the "prosocial" decision, the subject could choose between the allocation (1,1), i.e., (1 for himself, 1 for partner), and the allocation (1,0). Choosing (1,1) the subject can at no cost to himself deliver a benefit to the partner avoiding advantageous inequality. However, the choice of (1,1) can be driven by the equality motive or by a motive to increase the partner's payoff or both parties' joint payoff.⁷ In the "envy" decision, the subject could choose between (1,1) and (1,2). Here again, it is possible to deliver a benefit to the partner at no cost but the choice (1,2) leads to disadvantageous inequality for the decision-maker. Thus, if an individual just wants to increase the partner's or the joint payoff, he should choose (1,1) in the prosocial decision and (1,2) in the envy decision. In contrast, if the equality motive drives behavior in these two decisions, the subject chooses (1,1) in both decisions, thus avoiding the unequal allocations (1,0) in the prosocial decision and (1,2) in the envy decision. As in the prosocial decision, a purely selfish individual has no reason to make either choice in the envy decision. For this reason, evidence for the equality motive in the envy game again requires that the population of children choose (1,1) significantly above 50% frequency. In the "sharing" decision, the subject could choose between (1,1) and (2,0). This decision measures a strong form of inequality aversion because the provision of a benefit for the partner is costly for the subject. Selfish children should therefore

² Many previous experiments with children were run in schools (e.g. [Shawn et al., 2014](#); [Maggian and Villeval, 2016](#); [Fehr et al., 2008](#); [Benenson et al., 2007](#); [Martinsson et al., 2011](#); [Fehr et al., 2013](#); [Sutter et al., 2013](#); [Bauer et al., 2014](#)), in presence of the teacher, of the experimenter, or both ([Harbaugh et al. 2003a, b](#); [Fehr et al., 2008, 2013](#)). Our experimental sessions have been conducted during regular school hours. The main advantage of running the experiment in schools during the class is the limitation of a potential selection bias since school attendance is mandatory.

³ Each school was randomly assigned to one of two between-school conditions depending on the fact that they read and discuss Fairy Tales (82 children; 38 females; Age $M = 9.01$ years, $SD = 0.23$ years) and Environmental Tales (62 children; 29 females; Age $M = 9.02$ years, $SD = 0.20$ years). Data from the treatment assignment are analyzed in [Amato et al. \(2018\)](#).

⁴ Appendix A reproduces an English version of the Experimental Instruction for the games included in this manuscript.

⁵ Following [Buccioli and Piovesan \(2011\)](#) we avoided any explicit reference to monetary values since it has been shown that dishonest decisions are less frequent when money is used as currency (for a review see [Ariely, 2009](#), chap. 12).

⁶ Note that our experimental instructions did not explicitly say that children had to toss the coin only once, therefore, it is true that on one hand, a child may liberally apply the instructions and in fact report truthfully a third flip which benefits them. On the other hand, given that the coin toss occurred privately outside the class, a child motivated to cheat could have just reported the winning outcome without even tossing the coin.

⁷ As noted by Fehr, "economic self-interest is not involved in the prosocial game because the decision-maker receives one unit regardless of which choice he makes. It is therefore also possible that a selfish individual who does not care about the partner's payoff will choose (1,1). In fact, because there is no reason for a selfish individual to make either choice, a population of self-interested individuals would choose (1,1) in 50% of the cases. For this reason, evidence for other-regarding behavior in the prosocial game requires that the population of children choose (1,1) significantly above 50% frequency".

Table 1

Stories and questions presented in the SN elicitation.

Pictures presented	Questions to be answered for each picture
Story 1 One of Alessia's classmates was sick in the days when everyone learned a new song that should be learned by all the students. The classmate asks Alessia if she can teach her the new song, but Alessia refuses.	- In your opinion, did Alessia behave well or badly? Why? - How would you feel if you had behaved like Alessia? Describe your emotions. - Why would you feel like this?
Story 2 Marco's mother prepared two snacks in two containers, one for Marco and one for Giovanni. Marco decides to eat both his snacks and also Giovanni' snacks, leaving nothing for Giovanni.	- In your opinion, did Marco behave well or badly? Why? - How would you feel if you had behaved like Marco? Describe your emotions. - Why would you feel like this?

never make the egalitarian choice in this decision, implying that the choice of (1,1) unambiguously indicates other-regarding preference.

In the fourth meeting, to measure *sensitivity to social norm* (SN, henceforth), we asked all participants to judge the unkind behavior described in one of the stories reproduced in Table 1. In each class we presented one of the two stories randomly selected.⁸

In the Story 1 a female character treats unkindly a female classmate, while in the Story 2 a male character treats unkindly another boy. An English version of the judgments given by all the participating children are reproduced in the online Appendix B. In order to classify children, we consider the answers to the question “How would you feel if you would have acted as the (unkind) character? Why?” and in particular focus on the motivation (i.e. why). To classify judgments, we used binary coding rule: 1 if the judgment explicitly appeals to a social norm and 0 otherwise where appealing to social norm is associated with the use of the verb “should” suggesting that one should follow the prescription of a norm. For example, we consider the following replies as an appeal to social norms to explain why one would not feel ok in behaving unfairly:

- *if somebody ask you for a favor, that it was an important thing and **she had to be helped*** (subject 25, see page 4 of the online Appendix B);
- *because **you'd have to be polite**, help and respect other people* (subject 31, see page 4 of the online Appendix B);
- *because she is a classmate and **if she needs help you should help*** (subject 45, page 5 of the online Appendix B);
- ***you should always help** a classmate in need help* (subject 58, page 6 of the online Appendix B).

While sentences as the following are not judged as appealing to social norms:

- *because she will be scolded and I'm sorry because then she will be sad* (subject 2, see page 4 of the online Appendix B);
- *because I would have hurt the feelings of one classmate*, (subject 53, see page 6 of the online Appendix B);
- *because Alessia classmate was sick and it was not her fault if she was sick* (subject 56, see page 6 of the online Appendix B).

Two research assistants classified all messages and disagreement never occurred. The likelihood to appeal to a social norm in judging the (unkind) behavior does not depend on the story presented according to a ($\chi^2(1) = 2.685, p = 0.101$).

In our setting we cannot really measure the children sensitivity to social norm since we do not prime any norm in presenting the stories or in inviting children to judge the described (unfair) behaviors. An example in this sense would have been to ask children how one “should” behave in the situations described. In our experiment we ask children open questions about how they judge the described behavior and record whether they spontaneously appeal to social norms or not in order to motivate their judgments. For this reason, we believe that it is more appropriate referring to children's appealing to social norms rather than to children's sensitivity to social norms.

3. Hypothesis

As remarked in the introduction, a relevant aspect of children's social development is learning how to mediate between selfish motives and other regarding concerns. Other regarding preferences moderate child propensity to engage in unconditional self-serving behaviors, and may therefore control the child's tendency to cheat in certain social situations. Moreover, as we have seen, children tend to enforce social norms even when this may be subjectively costly, such as in cases when policing or reporting transgressing adults is at stake and the consequence of the act is uncertain. Here we want to test the relation between other regarding preferences, on the one side, and appeal to social norms, on the other side, and children's cheating behavior in the experimental context described in the previous section, that is in a context in which cheating behavior has no consequences for others. Moreover, we are interested in understanding whether these two effects can be seen as interdependent, i.e., at least partially relying upon a common set of prosocial motives and cues, or whether, to the contrary they are mutually independent and therefore reflect different forms of prosociality.

⁸ In the original design of the study we wanted to get for each child the judgment for both stories described. However, due to lack of time, in several classes, children have been only able to complete half of the task (i.e. the first story randomly presented to them).

Table 2
Decision in the BDG.

	Egalitarian allocation	Alternative allocation
Prosocial decision: (1, 1) vs (0, 1)	28.83% ($N = 32/111$)	71.17% ($N = 83/111$)
Envy decision: (1, 1) vs (1, 2)	86.49% ($N = 103/111$)	13.51% ($N = 15/111$)
Sharing decision: (1, 1) vs (2, 0)	9.01% ($N = 10/111$)	90.99% ($N = 101/111$)

Note: The first allocation in parenthesis always refers to the decision maker, while the second one to the partner.

Specifically, we aim at testing two main hypotheses related to the impact of other regarding preferences (Hypothesis 1) and appealing to social norms (Hypothesis 2) on the likelihood of reporting a winning outcome in the cheating game, that is our measure of the children's likelihood to cheat in contexts with no externalities on third parties.

Hypothesis 1. *Participants who exhibit other regarding preferences are less likely to report a winning outcome in the cheating game compared to participants who are selfish.*

Based on previous research, we know that there exist links between children other regarding preferences and their moral behavior in the contexts where cheating behavior may have consequences on others' payoffs. For example, [Maggian and Villeval \(2016\)](#) find that children with stronger other regarding concerns are less prone to dishonest behavior.

Our second hypothesis investigates the impact of appealing to social norms when judging an unfair behavior on the willingness to cheat.

Hypothesis 2. *Children who appeal to social norm in judging an unkind behavior are less likely to report a winning outcome in the cheating game.*

To the best of our knowledge, there is no direct evidence supports the association between appealing to social norm and the tendency to cheat. As for other regarding concerns, we expect that children who spontaneously appeal to a social norm are less likely to report a winning outcome in the cheating game.

4. Results

In this section we report our results. Note that the number of children participating in the different meeting varies because some children were ill in the day of the experimental session, for this reason we focus on 111 children who participated in both meetings.

First, we provide summary statistics on the average behavior in each game and explore the associations between these different measures gathered from each of the games. Then we present a regression analysis focusing on the association between (i) other regarding concerns in the BDG, (ii) sensitivity to social norms (SN) and the likelihood to report a winning outcome in the CT.

The likelihood to report a winning outcome in the CT is estimated both using the standard frequentist confidence intervals and tests (reported in the main text) as well as the Bayesian method proposed by [Hugh-Jones \(2019\)](#) which is especially suited when the sample size is small (i.e. smaller than 100 observations), whose estimates are reported in footnotes.

In the CG we find that on average 84.68% (94/111) of the participants report a winning outcome. This percentage is significantly higher than 50% according to a proportion test ($z = 7.3085$, $p = 0.000$, the associated 95% confidence interval goes from 0.7799 to 0.9138), suggesting that on average some of the participating children are cheating.⁹ Cheating is significantly associated to gender ($\chi^2(1) = -4.198$, $p = 0.040$) with girls being significantly less likely than boys to report a winning outcome (girls: 77.35% $N = 41/53$ vs boys: 91.38% $N = 53/58$, proportion test two-sided: $z = 2.049$, $p = 0.041$) despite the fact that we find evidence of cheating for children of both genders.¹⁰

[Table 2](#) reports the summary of choices in the BDG. It can be noted that most of the children dislike the egalitarian allocation but not in the "envy" decision, when it is preferred to the alternative allocation generating a disadvantageous inequality. Based on their choices in the BDG we classify as concerned by inequality 20.72% ($N = 23/111$) children who choose the egalitarian allocation both in the prosocial and in the envy decisions, but not in the sharing decision.¹¹

⁹ This result remains statistically significant if we use the estimation method proposed by [Hugh-Jones \(2019\)](#), which returns a posterior distribution over lambda equal to 0.6814 (where lambda is the probability that an individual in the sample lies and report white when they observe black) and an associated 95% confidence interval in the range 0.54628, 0.81000. This result confirms that with $N > 100$ we can safely use standard frequentist confidence intervals and tests.

¹⁰ Results are confirmed using the estimation method proposed by [Hugh-Jones \(2019\)](#): for girls we obtain a posterior distribution over lambda equal to 0.5273 (95% C.I. in the range 0.30460, 0.74000); for boys we obtain a posterior distribution over lambda equal to 0.8000 (95% C.I. in the range 0.65000, 0.93585).

¹¹ Compared to [Fehr et al. \(2008\)](#) we find a lower percentage of children who are classified as inequality averse. In [Fehr et al. \(2008\)](#), children are classified as strongly egalitarian if they choose the egalitarian allocation in all three decisions. The children that we classify as concerned about inequality are defined "weakly egalitarian" by [Fehr et al. \(2008\)](#).

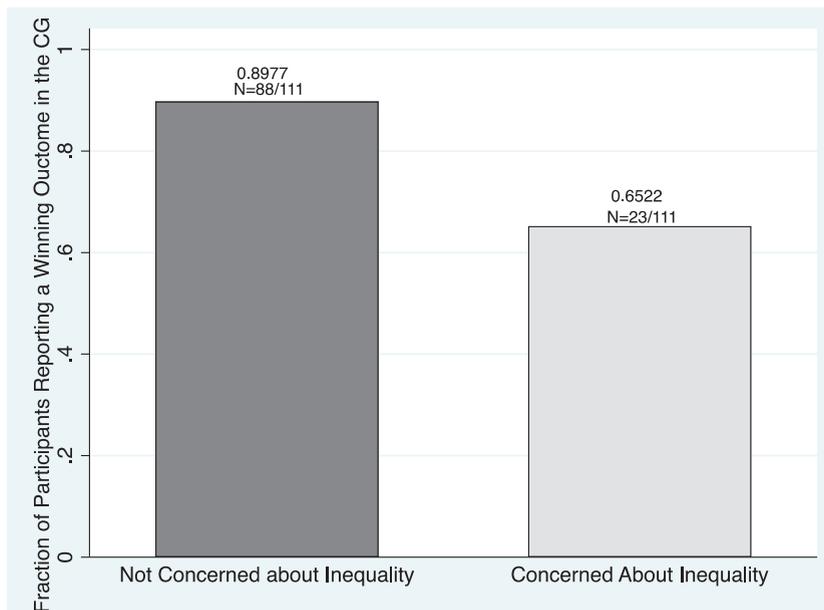


Fig. 1. Fraction of participants reporting a winning outcome in the CG depending on being classified as concerned for inequality or not.

Result 1 states our findings on the association of other regarding concerns and likelihood of reporting a winning outcome in the CG.

Result 1. *Children who are classified as concerned about inequality are less likely to report a winning outcome in the cheating game.*

Result 1 supports hypothesis 1: a significant association emerges when considering the likelihood of reporting a winning outcome in the CG and the classification obtained from the BDG ($\chi^2(1) = 8.477$, $p = 0.004$) with children classified as concerned about equality as being significantly less likely to report a winning outcome in the cheating game compared to the other children (65.22%, $N = 15/23$ vs 89.77% $N = 79/88$, proportion test two-sided $z = 2.9115$, $p = 0.0036$).¹² Additional support for Result 1 can be found in Fig. 1 which represents the fraction of winning outcome reported in the cheating game depending on being classified as concerned for equality or not.

Note that, in case of spillovers effects between the CG and the BDG we should observe that children who behave honestly in the CT should have a greater incentive to exhibit selfish behavior in the subsequent BDG, to compensate their behavior. Moreover, they have also a greater incentive to behave selfishly as they also have a lower payoff compared to those who reported a winning outcome in the CG. However, this goes in the opposite direction of our findings, since participants who exhibit other regarding concerns are also less likely in reporting a winning outcome in the CT, which is our proxy for cheating.

Next consider the association between appealing to social norm and the likelihood of reporting a winning outcome in the cheating game. If we consider the judgment of the unkind character described in story 1 and story 2, we find that overall 34.23% ($N = 38/111$) of participants appeal to a social norm when judging an unkind behavior. Appealing to a social norm is not differently associated to the story presented ($\chi^2(1) = 1.7633$, $p = 0.184$) and it is weakly associated to the gender of the participant overall but not when considering each story separately (overall: $\chi^2(1) = 3.782$, $p = 0.046$; story 1: $\chi^2(1) = 1.003$, $p = 0.317$; story 2: $\chi^2(1) = 2.819$, $p = 0.093$).

Our findings on the association between appealing to a social norm and cheating support hypothesis 2 and are summarized in Result 2:

Result 2. *Children who appeal to a social norm when judging an unfair behavior are less likely to report a winning outcome in the cheating game.*

Both statistical tests and Fig. 2 support our Result 2. We find that likelihood to report a winning outcome in the cheating game is significantly associated to appealing to social norm in judging an unkind behavior ($\chi^2(1) = 5.282$, $p = 0.022$).¹³

¹² Results are confirmed using the estimation method proposed by Hugh-Jones (2019): for children concerned for equality we obtain a posterior distribution over lambda equal to 0.3104 (95% C.I. in the range 0.00000, 0.57203); while for children not concerned for equality we obtain a posterior distribution over lambda equal to 0.7778 (95% C.I. in the range 0.64401, 0.90000).

¹³ Results are confirmed using the estimation method proposed by Hugh-Jones (2019): for children appealing to social norm we obtain a posterior distribution over lambda equal to 0.4508 (95% C.I. in the range 0.17000, 0.71610); while for children not appealing to social norm we obtain a posterior distribution over lambda equal to 0.7867 (95% C.I. in the range 0.64000, 0.91784).

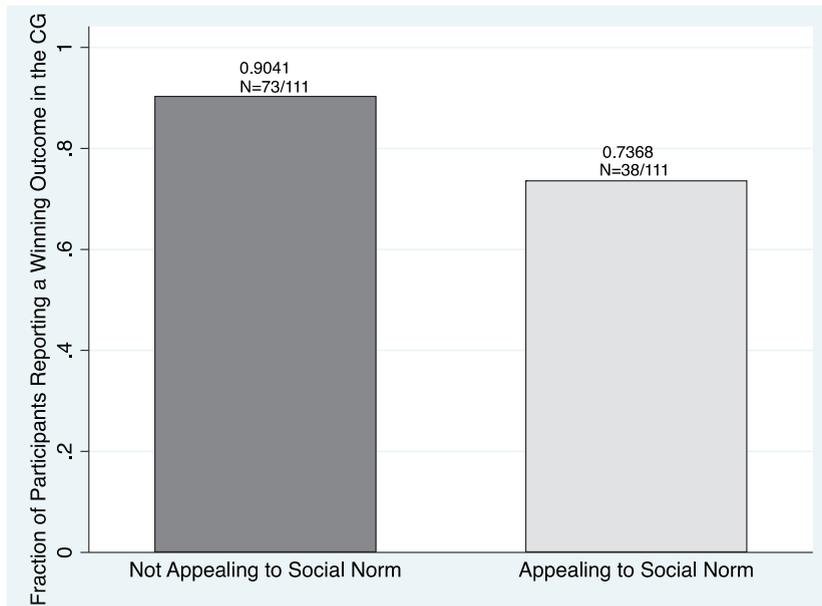


Fig. 2. Fraction of participants reporting a winning outcome in the CG depending on appealing ($N = 38/111$) or not to social norm ($N = 73/111$).

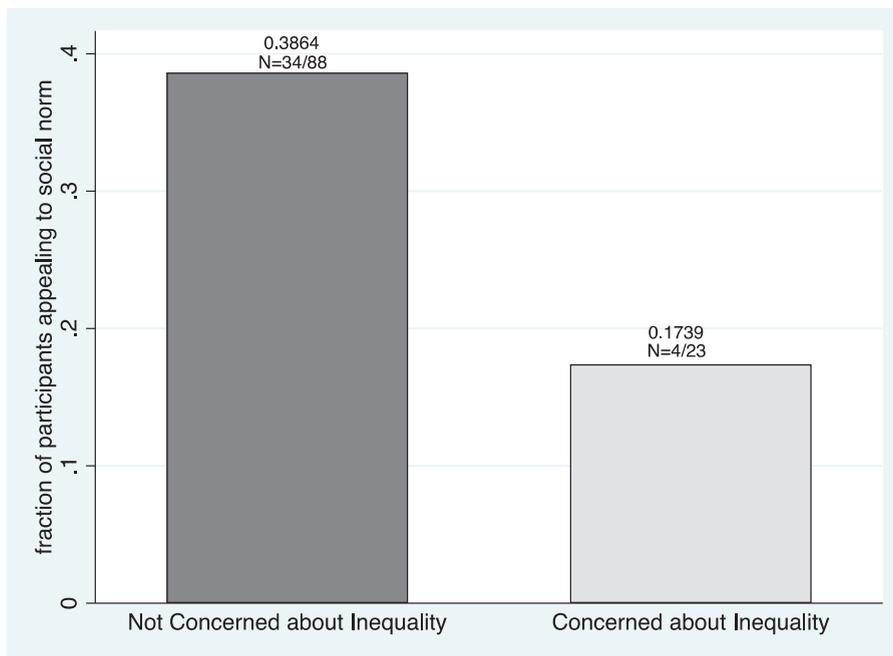


Fig. 3. Fraction of participants appealing to a social norm depending on being classified as concerned about inequality or not.

Appealing to a social norm and exhibiting other regarding concerns are two different mechanisms that may, however, be related to each other if, for example, children who exhibit concerns for inequality are also more likely to appeal to a social norm. In our sample, it seems that some children appeal to social norms, while others exhibit other regarding concerns with no significant association between these two measures. As can be seen by inspection of Fig. 3, the fraction of children who appeal to social norm is significantly lower among children who are classified as concerned about inequality compared to those who are not assigned this classification.

Table 3

Reporting a winning outcome in the coin toss.

Model	(1)	(2)	(3)	(4)	(5)
Estimation	Logit regression, marginal effects				
Dependent variable	Reporting a winning outcome in the coin toss				
Independent variables					
Concerned about inequality (dummy, 1 if classified as concerned about inequality in the BDG, 0 otherwise)	–0.2488*** (0.0857)	–0.2393** (0.1165)	–0.2219** (0.1100)	–0.2242** (0.1078)	–0.2210** (0.0920)
Social norm (dummy, 1 if judging an unkind behavior appealing to a social norm, 0 otherwise)	–0.2133*** (0.0614)	–0.2049* (0.1125)	–0.1892* (0.1041)	–0.1892* (0.1035)	–0.1916* (0.1007)
Concerned about inequality × social norm	–	–0.0237 (0.2312)	–0.0232 (0.2411)	–0.0255 (0.2373)	–0.0890 (0.2013)
Female (dummy, 1 if girl, 0 if boy)	–	–	–0.0759 (0.0709)	–0.0766 (0.0670)	–0.0617 (0.0695)
Single child (dummy, 1 if the child has no siblings, 0 otherwise)	–	–	0.0306 (0.0870)	0.0333 (0.0950)	0.0422 (0.0831)
Mother degree (dummy, 1 if the mother has a degree, 0 otherwise)	–	–	–	–0.0830 (0.0544)	0.0716 (0.0543)
Father degree (dummy, 1 if the father has a degree, 0 otherwise)	–	–	–	0.1168 (0.1101)	0.0634 (0.1075)
Parents work fulltime (dummy, 1 both parents work fulltime, 0 otherwise)	–	–	–	–0.0198 (0.0480)	–0.0527 (0.0440)
Weekly allowance (dummy, 1 child has a weekly allowance, 0 otherwise)	–	–	–	–	–0.0147 (0.0606)
Mobile phone (dummy, 1 child has a mobile phone, 0 otherwise)	–	–	–	–	–0.1166 (0.0282)
Individual extra-school activity (dummy, 1 child practice individual extra-school activities, 0 otherwise)	–	–	–	–	–0.0866 (0.0563)
Group extra-school activity (dummy, 1 child practice group extra-school activities, 0 otherwise)	–	–	–	–	–0.1512 (0.0377)
Observations	111	111	111	111	109
Log-pseudolikelihood	–39.0518	–39.0412	–38.2373	–37.3560	–33.2084
Wald chi²(10)	27.48***	26.28***	55.97***	–	–
Pseudo R²	0.1783	0.1785	0.1954	0.2139	0.2963

Standard errors in parentheses adjusted for 9 clusters in id_class.

*** $p < 0.01$.** $p < 0.05$.* $p < 0.1$.

To provide additional and more exhaustive evidence on our results in Table 3 we present the outcomes from a regression analysis. Our dependent variable is the likelihood of reporting a winning outcome in the cheating game. In Table 3 we report the Marginal effects from a set of Logistic regressions with errors clustered at the level of classes. In all models, we include as independent variable a dummy to account for other regarding preferences (*Concerned about inequality* takes value 1 if the child is classified as concerned about inequality in the binary dictator game and 0 otherwise) and a dummy variable to account for appealing to social norm (*Social Norm*, which takes value 1 if in judging the unkind behavior described in Table 1 the child appeals to a social norm and 0 otherwise). In model 2 we include the interaction between the dummies *Concerned about inequality* and *Social Norm*. In model 3 we exploit additional measures collected in our dataset, such as gender (captured by the dummy *Female* which takes value 1 for girls and 0 for boys) and whether the child has siblings or not (captured by the dummy *Single Child* which takes value 1 if the child has no siblings and 0 otherwise). In Model 4 we include information about the parents, such as their level of education (captured by the dummies *Father Degree* and *Mother Degree* which take value 1 if the father/mother reports having a university degree and 0 otherwise) and whether they work full time or not (captured by the dummies *Father Fulltime* *Mother Fulltime* which take value 1 if the father/mother reports working full time and 0 otherwise). Finally, in Model 5 we include other information about the habits of the child as reported by the parents (i.e. whether s/he has a mobile phone or not, whether s/he has a weekly allowance or not, whether s/he practice extra-school individual or group activities or not) in the attempt to map a number of characteristics that may predict the likelihood to cheat at the individual level.

In model 1 we find that children who are classified as concerned for inequality and children who appeal to a social norm are significantly less likely to report a winning outcome in the CT. We interpret this as a lower willingness to cheat. In model

2 we include an interaction of these two variables and we find that results of model 1 are confirmed while the interaction is not significant, in line with what highlighted in Fig. 3 and confirming our intuition that the concern for inequality and the appealing to social norm in judging an unfair behavior does not seem to be related to each other in our sample. Note, also, that the two variables display a sizeable coefficient which is not much affected by the introduction of additional controls in models 3–5. Notably, none of the controls included in models 3–5 achieve statistical significance, while the results of model 1 are confirmed.

5. Discussion

The fact that experimental subjects give up cheating in a context where such cheating does not damage others but only influences own payoffs may be regarded as evidence of norm internalization. The well documented relationship between honesty and other regarding preferences in situations where cheating may hurt others (Sheremeta and Shields, 2013) may owe part of its strength to an independent internalization effect that unconditionally extends the domain of the norm irrespective of the subjective evaluation of the extent to which cheating behavior might actually affects others (Gintis, 2010). In this perspective, norm internalization may be regarded as a more radical form of other-regarding preference where concern for others is not linked to situational evaluation but translates into a general purpose preference for honesty (Pruckner and Sausgruber (2013). Cooter (2000) characterizes the internalization of a social norm in terms of the willingness to pay to conform to it, and thus the foregone payoff from renouncing to cheat may be also interpreted as an indirect measure of norm internalization. Such interpretation seems consistent with our experimental results. We report results from a lab in the field experiment investigating the association between 9 years old children other regarding preferences, adherence to social norm and willingness to cheat.

We find that children who are concerned about inequality as well as children who appeal to social norm in judging unfair behavior are less likely to report a winning outcome in the cheating game, despite that honest reporting does not negatively affect others but only the child's own payoff. Both concern for inequality and appeal to social norm seem therefore to provide a basis for norm internalization. But are they different facts of the same mechanism or do they reflect different mechanisms at work?

Our experimental data corroborate the latter hypothesis. In our sample, being concerned about inequality and appealing to a social norm does not seem to be correlated, suggesting that these two mechanisms independently affect the children moral reasoning in the cheating game. This seems to suggest that norm internalization in children may be the effect of the complex superposition of a variety of prosocial mechanisms, whose co-evolution and complementarity in child development processes are still poorly known and call for further investigation.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.jebo.2019.11.016](https://doi.org/10.1016/j.jebo.2019.11.016).

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