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Working Paper

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Suggested Citation: Caserta, Maurizio; Distefano, Rosaria; Ferrante, Livio (2022) : The Good of Rules: An experimental study on prosocial behavior, ZBW – Leibniz Information Centre for Economics, Kiel, Hamburg

This Version is available at:
https://hdl.handle.net/10419/266393

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The Good of Rules: An experimental study on prosocial behavior

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In everyday life, individuals interact with relatives, friends and colleagues, share ideas and passions and cooperate with others to pursue common goals. Within each social domain, individuals recognize themselves as a group member with rights and duties to observe. Understanding the importance of social norms and encouraging mutually beneficial cooperation is crucial for societal and economic development. This paper presents an experimental study of an educational program for early adolescents of 11 years old from South Italy. The program introduces participants to institutions, civic engagement, sense of duty, and decision-making. Among other didactic activities, it includes guided tours and a role-taking game. Our results suggest that the program attendance positively affects cooperation in a one-shot Prisoner's Dilemma and altruistic behavior in a Dictator Game. Our findings contribute to the nature-nurture debate, showing that promoting prosocial behavior can be effective in pursing the common good.

Keywords: Experimental game theory; Group Decision Making; Cooperation; Prisoner's Dilemma; Dictator Game.

JEL codes: C72; C93; I20.

Declarations of interest: none.

1 Introduction

While economics explains human behavior as egoistically based, through the maximization of personal interest and the theory of incentives, behavioral and experimental economists observe that people may be willing to sacrifice their own benefit and behaving altruistically. The literature defines prosocial behavior as volunteering actions aimed to benefit others even if personal costs must be borne, causing a departure from what economic rationality prescribes (Batson, 1998; Biel and Thøgersen, 2007). In social dilemmas like the Prisoners' Dilemma, self-interest and collective interest are not aligned. Players have a dominant non-cooperative strategy whose outcome turns out to be suboptimal compared to mutual cooperation. But cooperation in itself is not sufficient to attain the social optimum, it requires the expectation that other players will also cooperate (Pruitt and Kimmel, 1977). In the Dictator Game, one single player makes a take-it-or-leave-it offer to a passive recipient. Every positive offer reduces the dictator's payoff and underlines that individuals are willing to sacrifice their self-interest when it is given them the opportunity to behave altruistically.

Cooperation, altruism, and generosity are all elements of prosocial behavior. Social psychology has long investigated the mechanisms behind such conduct and concluded that social norms and moral reasoning can be part of them (Blasi, 1980). Following the seminal work of Piaget (1928), the literature on economic psychology has investigated children's behavior in social dilemmas. Such studies help understand how moral reasoning, equity concerns, and economic thinking develop during childhood (Murnighan and Saxon, 1998; Fehr and Fischbacher, 2003). Many experiments find evidence that older children are more prone to engage in prosocial behavior because of their sensitivity to moral arguments and acquired cognitive abilities to understand others' perspectives (Kohlberg, 1969; Bohnet and Frey, 1999; Haidt, 2001; Takewaza et al., 2006).

In this paper, we show the result of an experimental program titled "Good of Rules" (GoR), a series of didactic activities for early adolescents of 11 years old, enrolled in the first year of a lower secondary school in South Italy. The program introduces participants to institutions, civic engagement, sense of duty, and decision-making and includes guided tours in symbolic places and a role-taking game. Our experimental design focuses on the role that lectures, interactions with adults, and direct experiences have in participants' prosocial behavior and fairness considerations. In this line, we believe that all parts of the GoR program and in the sequence presented are relevant to be effective on the behavior

of the participants. The logic is to expose students to social and institutional themes with verbal debates first, and to direct experiences and personal involvement, then.

We contribute to the nature-nurture debate and share the idea that nudging personal and social norms foster pro-sociality and fairness considerations (Brañas-Garza, 2007; Dal Bó and Dal Bó, 2014). We measure the effect of the GoR program on mutual cooperation and altruistic behavior through a one-shot Prisoner's Dilemma (PD) and a Dictator Game (DG), using chocolate eggs and candies as resources. Our results show that, cooperation and altruistic behavior significantly increased after GoR program attendance.

2 Altruism and cooperation in social dilemmas

Social norms shape individual behavior and regulate interactions among group members in society. Broadly defined as behavioral standards mutually accepted and shared in a community, social norms prescribe how individuals ought to behave in a given situation (Fehr and Fischbacher, 2004; Bicchieri, 2006).

From the seminal work of Rapoport et al. (1965), the experimental research has investigated the cooperative behavior of young and school children in social dilemmas. Notably, Fan (2000) runs an experiment with 196 children of 6-11 years old in Taiwan and reports that older children are more likely to cooperate. The author also tries to elicit prosocial behavior by exposing children to a short moral lecture on the benefits of cooperation and finds a positive short-run treatment effect. Cárdenas et al. (2015) analyze the relationship between cooperativeness and competitiveness in a sample of 9–12 years old students in Colombia and Sweden and find they are not mutually exclusive, leaving room for further research on designing appropriate educational tasks capable of fostering both dimensions. Indeed, the attitude toward cooperation and competition depends also on personality traits. In an experiment with 10-year-old children, Cook and Sloane (1985) point out that those with an internal locus of control (children who think to control the events in their lives) are more competitive. More recently, Blake et al. (2015), in a repeated PD with 10-11 years old children, document that repetitive interactions promote cooperation and that it is more likely to occur among girls and children with few conduct problems in school.

As for altruistic behavior, Benenson et al. (2007) conducted a DG with children aged 4, 6, and 9 years old enrolled in different British primary schools. Their results show that prosocial conducts are more pronounced in older children and in those with a higher

socioeconomic status. Other experimental evidence has focused on the effects of moral suasion on pro-sociality. For instance, Capraro et al. (2019) find that moral nudges increase altruistic behavior in a DG right after the solicitation. They also show that the effects are persistent over time and across several social contexts. In testing framing effects in DG, Brañas-Garza (2007) conducted an experiment among students of two different universities in Spain. He found evidence that promoting helping behavior in framing the game significantly increases generous behavior.

3 Experimental design and procedure

We conducted the Good of Rules (GoR) experiment in the lower secondary school Giosuè Carducci in Catania (Italy) during the 2018-2019 school year. In the experiment, we involved all the six first-year classes of the school, with students of about 11 years old (corresponding to the US sixth grade). The average class size is of 20 students, in line with the Italian average, according to OECD report "Education at a Glance" (2021). For the experiment, the school is a suitable environment for three reasons. First, in the school context, students are likely to perceive the GoR program as relevant as other subjects. Second, the education stage chosen is part of compulsory education, so results are less likely to be susceptible to selection bias. Third, delivering the program during hours of compulsory instruction reduces possible attrition effects related to the dropout rate.

Early adolescents are an appropriate target group for the GoR program. Adolescence is a period of developmental transition between childhood and adulthood. While some studies report that, in such a period, traditional social values are questioned, and antisocial behaviors are likely to occur (Caissy, 1994), other studies suggest that young adolescents are more susceptible to moral arguments since prosocial behavior develops with age (Kohlberg, 1969; Eisenberg et al, 1987). Thus, we expect the program to be effective in the age range considered.

To evaluate the effectiveness of the GoR program on children's behavior, we employed a randomized experimental approach. Without giving specific information, we obtained formal authorization to collect data from parents of 96 children out of 121. Two children were assisted by a support teacher and excluded from the final estimates. Thus, the final sample consists of 94 students and 188 observations.

At the beginning of the second semester, in February, we collected data on demographic and family characteristics, such as gender, number of siblings, and average grade in scientific and humanistic subjects. We created two homogeneous groups of

classes according to gender, parents' education, and class size. In the context of public schools, students are randomly allocated to different classes. We conducted a further randomization to assign the program at the group level, so that each class has the same probability to be assigned to the treatment. Three classes received the GoR program (Treated group), whereas the remaining three did not (Control group). Table 1 shows the descriptive statistics of the variables for the treated and control group at the baseline 2018–2019 school year, including the children's grades in math, science, and humanistic subjects. We find no statistically significant differences between the mean scores of the two groups.

Table 1. Characteristics of treated and control group at the baseline 2018–2019 school year.

Characteristics	Treated group	Control group
Grade level	6	6
Percentage female	0.43	0.48
Percentage living with both parents	0.80	0.67
Percentage with more than one sibling	0.20	0.29
Average grade in math and science	7.21	7.42
Average grade in humanistic subjects	7.39	7.15
Number of students	46	48

Before the experiment took place, we conducted a Prisoner's Dilemma and a Dictator Game to test children's cooperative and altruistic behavior at the baseline. In each class, both games were conducted on the same day, but due to the numerosity, the six classes were completed in 3 days and, in any case, before the treatment was assigned. Since the participants of both treated and control groups belong to the same school and can interact with each other, the results of the control group might be biased upward because of contamination effects. In such a case, the treatment effect can be interpreted as the minimum effect of the program compared to its potentiality.

The GoR program started four weeks after the baseline games. It consists of ten weekly meetings, two hours each, conducted by external instructors not involved in the impact evaluation analysis. In framing the program, we adopted a learning-by-playing approach, combining four seminars, two guided tours, and a role-playing game that call for cooperation and active student participation. Seminars were held by keynote speakers, each of which contributed in terms of expertise and experience acquired in their profession. The first seminar was held by a jurist, who introduced students to themes of

law and institutions. A public prosecutor treated legal issues and the importance of playing by the rules in any environment in the second seminar. The third, held by a firefighter, was about civic engagement and the importance of solidarity within a community. The last speaker was an athlete, who explained the importance of mutually cooperation in team games. Having arguments with the experts allowed pupils to develop and exchange opinions and beliefs among them.

Two external experts in educational science guided students in two locations with civic and symbolic meanings and carried out the role-playing game. The aim of the tours was to offer students an experience-based learning opportunity to see first-hand what they learned during the seminars. The first location was the botanical garden, to raise awareness of the respect for the environment and biodiversity. The second tour was in an agricultural enterprise seized from criminal organizations and reassigned to a cooperative, to better understand the importance of legality. The role-playing game consisted of four meetings. Students were assigned into different tribes, belonging to a made-up village, and endowed with a set of resources needed to develop common tasks.[1] Then, experts asked them to manage conflicts, cooperate and exchange resources among them to build infrastructure within the village. Given the design of the GoR program and the impact evaluation method, we doubt that results may suffer from teaching-to-the-test effects. We ensure that external experts and school staff ignored the structure of our experiment and that students would have been evaluated. Besides, the program does not stress cooperation and altruistic behavior more than other contents. The external instructors did not receive any remuneration but participated in the program on volunteering basis and the PD and DG games were conducted in their absence.

At the beginning of the 2019-2020 school year, we conducted a second round of data collection, repeating the PD and UG, on the participants of the GoR program. We thus estimate the following regression:

$$y_i = \alpha + \beta TREATMENT_i + \gamma PERIOD_i + \delta TREATMENT_i * PERIOD_i + \theta \boldsymbol{X}_i + \varepsilon_i,$$

where y_i is the outcome; $TREATMENT_i$ is a dummy equal to 1 if the student i is in the treatment group; $PERIOD_i$ is equal to 1 when the outcome refers to the second data collection; $\boldsymbol{X_i}$ is a vector of control variables which comprehends the gender, the presence of more than one sibling and a dummy equal to 1 if the student lives with both parents. The coefficient δ shows the GoR treatment effect on participants' social behavior. We

[1] Instructions may be provided upon request.

use either a probit or a Poisson regression model whether the dependent variable is a dummy or a count indicator. Standard errors are clustered at the class level in each specification.

Prisoner's Dilemma (PD)

We randomly assigned children to groups of 4 or 5. During the game, the participants were seated far away from each other to avoid explicit collusive strategies. Each student received two cards, one marked with the word "BIG" and the other with "SMALL". Students were told that the game was one shot. We designed material incentives to elicit motivation and active participation in the game. Prizes consisted of a big chocolate egg, a small chocolate egg, a consolation candy. We carefully explained loud the payoff matrix in Table 2 and allowed students to ask questions to ensure they understood the matrix. We then asked them to pick a card and hold it facedown. After everybody chose, we asked to reveal the card selected and thus gave the prizes accordingly.

Our PD game has a dominant strategy ("BIG"), in which each participant receives one small egg. However, the Pareto optimal outcome would be achieved through cooperation ("SMALL", "everyone SMALL"), with two small eggs per student.

Table 2. Payoff matrix of PD (in brackets, the relative values of prizes).

Child \ Others	At least someone BIG	Everyone SMALL
BIG	1 SMALL CHOCOLATE EGG (4)	1 BIG CHOCOLATE EGG (12)
SMALL	1 CANDY (1)	2 SMALL CHOCOLATE EGGS (8)

Dictator Game (UG)

Children were given ten candies and a blank sheet each. To abstract from possible framing effects (see Krupka and Weber, 2013), we did not stress moral concerns prior the game, but asked them to write down how many candies (from 0 to 10) they were willing to transfer to a second (unknown) child. Any increase in the number of candies offered with respect to the baseline game will suggest an increase in fairness concerns.

4 Results

In Table 3, we report the outcome scores for both groups and periods (before and after the treatment). In the pre-treatment period, we observe that the share of non-cooperative choices in the Prisoner's Dilemma (variable $PD_Non\ cooperative\ choice$) and the number of candies offered in the Dictator Game (variable $DG_Candies\ offered$) do not significantly differ between treatment and control groups, as confirmed by the *t-test* for each variable.

A preliminary inspection of the data in the follow-up period suggests that the number of treated students choosing the non-cooperative strategy in the PD significantly decreases after the GoR program (from 49% to 28%); whereas, in the control group, no difference arises (58%). As for the DG, in the treatment group, the average of candies offered slightly decreases (from 4.81 to 4.72), whereas, in the control group, the average decreases of about 13% (from 5.02 to 4.34).

Table 3. Outcomes of treated and control group.

Variables	Pre-treatment period			Post-treatment period		
	Treated group	Control group	*t-test* (p-value)	Treated group	Control group	*t-test* (p-value)
$PD_Non\ cooperative\ choice$	0.49	0.58	0.4230	0.28***	0.58***	0.0001
$UG_Candies\ offered$	4.81	5.02	0.4198	4.72*	4.37*	0.0434

Note: ***, **, and * indicate statistically significant difference between groups at 0.1, 1, and 5 percent, respectively.

Table 4 reports the results of our regression analysis. The GoR program appears to negatively affect the share of students who choose the non-cooperative strategy in the PD, with a statistical significance at the 0.05 level. The marginal effect of the coefficient $TREATMENT * PERIOD$ shows a reduction of non-cooperative behavior of around 30%. Thus, our results show that stimulating moral reasoning in early adolescents through education activities promotes cooperation even though it is not the dominant strategy.

In the DG setting, the treatment effect significantly increases the number of candies offered (the marginal effect of $TREATMENT * PERIOD$ is 0.58 and statistically significant at the 0.05 level). This confirms that the GoR program elicits fairness concerns in the allocation of resources. The results of the regression analysis are depicted in Figure 2, in which we display the prediction values of the outcome variables according to the regression models with control variables (even columns of Table 4).

Table 4. Estimation results.

	Probit model		Poisson regression	
	PD_Non cooperative choice		DG_Candies offered	
VARIABLES	(1)	(2)	(3)	(4)
TREATMENT	-0.2104	-0.1893	-0.0441	-0.0350
	(0.2296)	(0.2336)	(0.0556)	(0.0510)
PERIOD	0.0000	0.0034	-0.1377*	-0.1377*
	(0.2865)	(0.2920)	(0.0545)	(0.0545)
TREATMENT ∗ PERIOD	-0.6407*	-0.6478*	0.1194*	0.1194*
	(0.2985)	(0.3070)	(0.0588)	(0.0588)
Other controls	NO	YES	NO	YES
Constant	0.2104	0.6235*	1.6136***	1.5519***
	(0.1373)	(0.2763)	(0.0335)	(0.0410)
Observations	188	188	188	188
GoR marginal effect	-0.2553*	-0.2581*	0.5640*	0.5633*

Note: ***, **, and * indicate statistical significance at 0.1, 1, and 5 percent, respectively.
Robust standard errors clustered at the class level in parentheses.

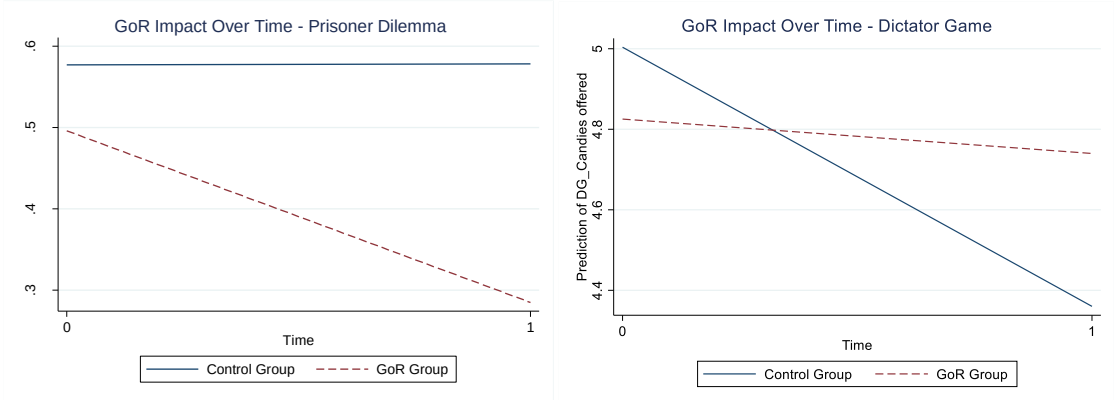

Figure 2. Predictions of GoR impact.

5 Conclusions

In this report, we show the results of the experimental program *Good of Rules* conducted on sixth-grade students in South Italy. The purpose of the program is to elicit fairness perceptions and raise pupils' awareness of the value of social norms. Our findings contribute to the experimental literature that investigates teaching effects on early adolescents' behavior (Camasso and Jagannathan, 2018; Sconti, 2022). We show that teaching the *good of rules* increases significantly cooperative behavior in the PD and inequity aversion in the DG. Our results are in line with the experimental literature that

explores the effect of social and human capital (for instance, participation in civic and cultural activities) on individual and collective behavior (La Porta et al., 1997; Fan, 2000; Dreber et al., 2014).

The results of the GoR pilot program, though preliminary, provide positive support for the implementation of similar paths that involve students directly into the learning process, with debates and personal experiences. Although we recognize the limits of the experiment, caused mainly by the small number of students in the sample, our results stress the key role of education on prosocial behavior in an environment, which South of Italy characterized with low levels of social capital. Further research could focus on other regions to observe the impact of the program in different social contexts and territorial characteristics.

Important policy implications can be drawn on the priority role of civic education and the comprehension of the value of norms in encouraging prosocial behavior, with long-term effects on socio-economic development.

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