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ESSAYS ON SOCIAL PREFERENCES IN CHILDREN  
AND ADOLESCENTS:  
EXPERIMENTAL EVIDENCE FROM COLOMBIA  
AND INDIA

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## **Dissertation – Overview**

- (1) Development of Social Preferences in Children: An Experimental Approach in Colombia  
(joint work with Marcela Ibañez Diaz, and Pooja Balasubramanian)
  
- (2) Religious Identity and Altruistic Giving: A Field Experiment with Children in India  
(joint work with Marcela Ibañez Diaz, and Pooja Balasubramanian)
  
- (3) Highly Mentally Occupied to Harm Others: An Experimental Joy-of-Destruction Game  
under Cognitive Load with Children in Colombia

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# Chapter 1

## Introduction and Overview

Childhood is a decisive period where children develop their own personality. Several factors influence this development, e.g., parental style and social interactions can enforce pro- and antisocial attitudes (Kosse et al., 2019; Gaik et al., 2010). Thus, especially in economics, there is a growing interest in evaluating preferences in early age. Here, we develop three studies which examine social preferences during childhood and adolescence, and look at how they change over time, which is crucial for broadening the understanding of behavioral patterns.

In the last two decades, there has been increasing interest in researching economic behavior in children and adolescents. Since the pioneered work of Harbaugh and co-authors (2000, 2003a, 2003b, 2007), economists have been implementing experiments to elicit time preferences, risk preferences, social preferences, and the rationality of decisions of three to 20 year-old children and adolescents in different contexts (see for example for a recent review by Sutter et al. (2019))

This dissertation contributes to broadening research on the prosocial and antisocial preferences in children through three studies implemented in Colombia and India. In particular, this dissertation attempts to extend the understanding of three behavioral aspects. First, we evaluate which motivates are relevant for creating and maintaining risk-sharing groups and whether these motives develop with age or are stable over time. Secondly, we disentangle pure altruism and warm-glow motivations when the identity of recipients is salient, i.e., they belong to the in- or the out-group. Third, we complement these studies on prosocial behavior with the elicitation of antisocial behavior when decisions are made under cognitive load.

### 1.1 Preferences in Children

From a young and early age, children behave rationally and develop a strategic sophistication of their decisions. As children grow older, they commit fewer violations of the generalized axiom of revealed preferences (GARP), and by around 11 years of age, violation levels are comparable to those found in adult subjects (Harbaugh et al., 2001; Haidt, 2001). Moreover, strategic sophistication develops in early childhood; four to seven-year-old children are able to make decisions to reach efficient outcomes, and compared to 10 to 17-year-old children, there are no significant differences in the level of strategic sophistication (Brocas and Carrillo, 2018a; Czermak et al., 2016). Furthermore, older children are better at forming beliefs about others and they are also able to anticipate others' behavior, and the over-15s use similar strategies to

form their beliefs and expectations, just like adults do (Barash et al., 2019; Brocas and Carrillo, 2018b).

Findings of dictator games to study social preferences show that in early childhood, children are more selfish, but this behavior decreases as they reach the age of four, furthermore, older children prefer more egalitarian allocation so as to avoid inequalities (Fehr et al., 2008; Bauer et al., 2014). Past the age of nine, children become efficiency-seekers (Almås et al., 2010). Additionally, the amount shared by the dictator is positively correlated with self-control, higher IQ, risk aversion, and patience (Angerer et al., 2015b; Blake et al., 2015; Chen et al., 2016b; Eckel et al., 2011; John and Thomsen, 2015).

Helping behavior is motivated by social image concerns, the deservingness of the recipient and norms of fairness. In economic experiments with children, there is an increase in the level of sharing in dictator games, especially among popular children, when donations are publicly announced (Chen et al., 2016b). If the game is framed as a competition, the amount transferred by the dictators decreases (Houser and Schunk, 2009). One way to measure the deservingness of the recipient is to observe how much effort she exerted in a task. Almås and co-authors found that 10- to 11-year-olds do not respond to the effort level of others, but when they reach age 15, adolescents become more meritocratic, and perceive the fairness of earnings being proportional to the exerted effort (Almås et al., 2017, 2010). Finally, prosocial behavior can be influenced by fairness, which is usually elicited using ultimatum games. Previous studies did not find any differences on offers in these games comparing different age groups, which shows that children develop a sense of fairness even in early childhood (Harbaugh et al., 2003a, 2007; Murnighan and Saxon, 1998; Sutter and Kocher, 2007).

The prisoner’s dilemma and public good games are the most popular for examining cooperative behavior. Among children, there is evidence that the likelihood of cooperation is higher for older children, and younger children are more likely to free ride in public good games (Angerer et al., 2015a; Brocas et al., 2017; Harbaugh and Krause, 2000; Houser et al., 2012). Although most of the studies do not find gender differences in the likelihood of cooperation (Brocas et al., 2017; Cárdenas et al., 2014; Harbaugh and Krause, 2000; John and Thomsen, 2015), few studies found higher cooperation in girls than boys. For instance, Angerer et al. (2017) found that girls aged between six and 11 are more cooperative than boys. In addition, Cárdenas et al. (2014) found that Colombian girls cooperate less than Swedish girls, and in Sweden girls cooperate more than boys, in both countries children cooperate more with boys. Finally, Angerer et al. (2015a) use an in-group/out-group design and found that children cooperate less when they are matched with a child from the out-group.

This thesis analyzes social preferences in children from three different perspectives. First, we consider the development of motivations for giving in a solidarity game with children from Bogota, Colombia. Second, using a structural estimation of the utility function, we disentangle the role of warm-glow and pure altruism in giving. We consider the role of religious identity on those preferences in children in Mumbai, India. Third, we evaluate whether antisocial behavior is based on reflexive or intuitive mental processes using a joy-of-destruction-game under cognitive load with school children from Bogota.

First, we examine the drives of solidarity norms to aim at disentangling the different

motivations of giving. Using a unique longitudinal data set, we look at the development of prosocial preferences over time. Our experimental design allows us to capture different individual motivations for giving such as altruism, social image, reciprocity, and deservingness. As we follow children aged 9 to 15 over three consecutive years, we can identify the critical age at which social preferences might change. We found that there is a critical age at which altruistic preferences develop. Between the age of 9 and 11 children become more likely to send transfers to members in the network that have been affected by negative income shocks. This behavior is also correlated with behavior observed outside the lab. Preferences for reciprocity and image concerns develop later, and emerge in pre-adolescents. Among our sample, we find little evidence on norms that reward high-productive peers, by sending larger transfers to participants that have been more productive. Prosociality of the parents and direct experiences of receiving solidarity in daily life do not correlate with prosociality in the lab. Yet norms of conditional reciprocity play an important role. Those participants who expect to receive help outside the lab, are more likely to send transfers.

Second, we study the motivations of prosocial giving. Using a unique experimental design, based on [Ottoni-Wilhelm et al. \(2017a\)](#), we are able to disentangle pure altruism and warm-glow motivations of giving for across children aged between 7 and 17. Apart from observing differences of these two motives of giving across age groups, we also observed how pure altruism and warm-glow varies when the identity of the recipient becomes salient. We conduct economic experiments in India where religious identity, especially between Hindus and Muslims is very prominent. In this context, we test how warm-glow and pure altruism change when the religious identity of the recipient changes from an in-group member relative to an out-group member. We find that pure altruism is positively correlated with age and is particularly significant for the oldest age group (aged 13 to 17). Warm-glow is negatively correlated with age. However, on average, warm-glow is the stronger motivation for prosocial giving among for all ages compared to pure altruistic motivation. The role of the recipient’s religious identity is only salient for the middle and older age groups. When the recipient is from the in-group, there is no change in pure altruistic giving but warm glow giving is lower for the oldest cohort compared to younger age groups. However, when the recipient is from the out-group, pure altruism is significantly high for children older than 13, and they also show lower warm-glow giving compared to younger age groups. In our sample, we find that warm-glow, a strong motivation for prosocial giving, is not necessarily motivated by the interest to favor the in-group. Contrarily, we find empathy towards the recipients that belong to the out-group, and also that charitable giving of the parents to be correlated with higher warm-glow giving.

Third, we evaluate antisocial behavior stems from intuitive or reflexive processes. To test this, we implement an experimental design that includes a cognitive-load component. In this design, 12-year-old children are given the opportunity to reduce others’ endowment while they simultaneously complete a memory task, which is believed to hinder deliberation. We chose pre-adolescents because they are near to reach the age of criminal responsibility, which could give useful insights about behavior at this age for potential economic and educational policy implications. We find evidence that, on average, antisocial behavior is less frequent when cognitive resources are taxed. This result is driven by boys, who are less likely to reduce others’

endowment compared to girls. As part of the experiment, children play a dictator game that elicit a baseline prosocial behavior. Using psychological test to measures of antisocial behavior, we found a high correlation between the scores of these tests and behavior in the lab. Finally, we find that antisocial behavior is less frequent for children who are more reflective and have greater cognitive ability.

## 1.2 Research Methodology

The research methodology used in this dissertation is economic experiments. This methodology allows the isolation of effects when individuals make economic decisions in a simplified and controlled environment. Thus, experimenters can easily identify causal effects by adjusting experimental conditions, which is an advantage over happenstance field data where processes are uncontrolled by the experimenter. Moreover, data collected in experiments facilitate the elicitation of individuals' preferences under particular circumstances (Kagel and Roth, 2016). For these reasons, in two studies a lab-in-the-field methodology was implemented and in another study a field experiment was used.

In the first study, we implement four different treatments where participants have to play a solidarity game for four rounds (Selten and Ockenfels, 1998). To identify motives for helping in a risk-sharing group, we modified the game rules in each round. We programmed and ran different treatments using *oTree* (Chen et al., 2016a). Treatment conditions varied accordingly to public information available to participants, i.e., information about the partner's decisions varies across treatments and rounds. In the second study, participants received some endowment for fulling a paper-based survey and they then had the opportunity to donate part of their endowment to a foundation. We vary the identity of recipients by treatment and estimate whether there is evidence of changes in motivations for donating. We estimate the parameters for pure altruism and warm-glow in each treatment and across age groups. In the last study, an economic game where people could behave antisocially was programmed in *oTree* and implemented in five schools in Bogota. In this case, we varied the level of cognitive load while participants had to make decisions in a game where the option to behave antisocially was given.

## 1.3 Dissertation Outline

In risky environments, some individuals, in particular the poor in less-developed countries, cannot access formal mechanisms of insurance and credit, especially due to the high costs of writing and enforcing legal contracts between parties in courts. Thus, individuals engage in informal risk-sharing groups which have unwritten agreements to cope with unexpected negative shocks (Townsend, 1994; Udry, 1994; Fafchamps and Lund, 2003; de Weerd and Dercon, 2006; Bhattamishra and Barrett, 2010; Angelucci et al., 2015; Kinnan and Townsend, 2012). These groups rely on mutual cooperation among friends, relatives, and neighbors. Individuals form and maintain these agreements through several motives. For instance, where information within the network is available, a self-interest motivations to receive future reciprocity plays an important role for creating a reputation in repeated interactions. Additionally, there are intrinsic

motivations like guilt, shame or altruism; and extrinsic motives like social sanctions, retaliations, and isolation that also are important for maintaining these informal networks (Kimball, 1988; Coate and Ravallion, 1993; Ligon et al., 2002; Foster and Rosenzweig, 2001; Bénabou and Tirole, 2006; Charness and Genicot, 2009). In Chapter 2, we examine individual motives for helping in informal risk-sharing networks and how these motives develop with age in children and adolescents. Specifically, we investigate altruism, social image concerns, reciprocity, and deservingness. We implemented a lab-in-the-field economic experiment where a risk-sharing network is simulated through a solidarity game. We collect information over three consecutive years, namely 2016, 2017, and 2018 to build a panel data set. In the first wave, 1,666 children participated, in the second 1,695, and in the last wave 911. This study was implemented in four randomly selected schools in Bogota, Colombia.

According to altruistic behavior models, helping others could be motivated by pure altruism, i.e., individuals care about the total benefit of helping, and by warm-glow, which means that individuals help others because they get pleasure from doing so (Andreoni, 1989). These various motives can be influenced by how salient the identity of the recipient is (Kranton et al., 2013; Chen and Li, 2009; Costard, 2011; Corr et al., 2015; Ahmed, 2008; Pan and Houser, 2013). In a society with minority groups, it is important to identify what motives drive support between groups (Kumru and Vesterlund, 2010; Andreoni and Petrie, 2004; Harbaugh and Krause, 2000). In Chapter 3, we evaluate how motives for sharing vary for different age groups when the recipient belongs to an in- or an out-group. We implement experimental sessions that include a similar design implemented by Ottoni-Wilhelm et al. (2017a), which allows us to estimate the relative importance of pure altruism and warm-glow within individuals. Here, in Chapter 3, we examine pure altruism and warm-glow in children and adolescents. We implement a field experiment to investigate how these motivations for helping develops with age and whether these motivations change with the identity of the recipient. Data collection for this study was carried out in 2017 and 2018, and 1,820 school children from eight schools in Mumbai, India, participated in the experimental sessions.

It has been found that antisocial behavior deters economic success. Vandalism, theft, and criminality, in general, are costly for the whole society (Dishion and Patterson, 2015; Jolliffe et al., 2017; Patterson et al., 1990; Reid and Patterson, 1989). According to the literature on antisocial behavior, parenting, socio-economic context, peer socialization, and internal factors affect the development of antisocial behavior in children (Gaik et al., 2010). In Chapter 4, we evaluate whether antisocial behavior is correlated with the availability of cognitive resources in school pre-adolescents. Data collection for this study was done in Bogota in 2017. In total, 882 children from five schools participated. In this chapter, we investigate how spiteful behavior is affected by different levels of cognitive load in 12-year-old school children. We implement a lab-in-the-field experiment where participants make decisions in a joy-of-destruction game while their cognitive capacity is loaded by a memory task.



## Chapter 2

# Development of Social Preferences in Children: An Experimental Approach in Colombia

### 2.1 Introduction

In the absence of alternative mechanisms of formal protection (e.g., insurances and social security), informal networks or risk-sharing groups play an important role protecting households against idiosyncratic risks (Dercon, 2002). Gift-giving, interest free credit, shared meals, communal access to land, and work-sharing arrangements have been extensively documented in developing countries (Townsend, 1994; Udry, 1994; Fafchamps and Lund, 2003; de Weerd and Dercon, 2006; Bhattamishra and Barrett, 2010; Angelucci et al., 2015; Kinnan and Townsend, 2012). We contribute to this literature investigating the intrinsic and extrinsic motivations for risk sharing when there is limited enforceability.

The theoretical literature outlines various motivations that enable risk-pooling when there are limited commitment and lack of formal enforceability. For instance, Kimball (1988) and Coate and Ravallion (1993) propose that expected future reciprocity explains the subsistence of informal risk sharing. Reciprocity is associated with quid pro quo norms, in which ‘I will help you today if you help me tomorrow.’ Ligon et al. (2002) and Foster and Rosenzweig (2001) extend the notion of reciprocity and consider that past history matters. Their theoretical models suggest that with binding imperfect commitment constraints, individuals that have made net transfers in previous periods are more likely to receive subsequent transfers than households that have been the net recipients of transfers. This suggests that reputational concerns can motivate risk sharing. Bénabou and Tirole (2006) extend this idea to consider that the reputational value can be instrumental (attract more rewards) or purely hedonistic (elicit social esteem).

Another mechanism that could facilitate risk sharing, as proposed by Becker (1981), is altruism or mutual caring. The theoretical models that formalized this idea show that while imperfect commitment constraints deter informal transfers, altruism and guilt counterbalance it, thereby increasing the gains of income pooling (Cox et al., 1998; Foster and Rosenzweig, 2001;

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This chapter is joint work with Marcela Ibañez and Pooja Balasubramanian.



Lin et al., 2014, 2019). Moreover, altruism can be affected by the perceived deservingness of the beneficiary (Fong, 2007; Cardenas et al., 2008; Candelo et al., 2019).

Building on those theories, we design an economic experiment that allows us to disentangle different motivations for risk sharing. In particular, we consider the role of altruism, reputation, reciprocity, and deservingness in the subsistence of informal risk-sharing. The novelty of our study is that we use a longitudinal study in which school-age children are followed over three consecutive years. Hence, we can study the development of motivations for risk sharing and how they are affected by cognitive development and socioeconomic circumstances. The context of our analysis is Bogota, Colombia, where the population is subject to substantial degrees of idiosyncratic risks, such as unemployment and diseases. Among our sample, almost 40 percent of the participants reported that their household had faced a difficult economic situation in the previous month. Furthermore, risk-sharing is common among them and about one third of the sample reported that their families received or offered help to others in need.

Our empirical strategy is based on a lab-in-the-field experiment that uses a modified version of the solidarity game by Selten and Ockenfels (1998). In this three-person game, participants engage a real effort task and receive a piece-rate payment. Simulating the effect of negative income shocks, one randomly selected participant in the group loses all her earnings. Before knowing who is affected, participants decide how much of their earning they want to transfer to the affected participant. To disentangle different motivations for giving, we use a between-within experimental design in which each participant takes four transfer decisions. In each decision, we vary i) the informational conditions under which participants decide (anonymous or public), and ii) the feedback that other persons receive on the donor and recipient's degree of altruism or earnings. This allows us to disentangle four different motivations for risk sharing.

First, transfers might be motivated by generalized altruism, i.e., the willingness to improve the welfare of others even when this involves reducing own income (Andreoni, 1989; Charness and Rabin, 2001; Cox et al., 2002; Coate and Ravallion, 1993). To elicit this motivation, participants decide anonymously on the value that they would like to send to the anonymous loser. Second, participants might transfer due to social image concerns and the interest to maintain a good reputation (Andreoni and Miller, 1993; Engelmann and Fischbacher, 2009; Bénabou and Tirole, 2006; Fafchamps and Lund, 2003). To study this motive, we randomly allocated participants to either a control group in which they decided privately or a treatment group in which decisions were public. Participants in the treatment groups are informed that after completing the decision i) the value transferred, ii) or the share of the income transferred would be common knowledge. Compared with the control group, we expect that participants with reputational concerns increase transfers when the value transferred or the share transferred is public knowledge.

A third motivation for transfers is reciprocity norms. To disentangle this motivation, we inform participants that in the third and fourth round others can condition their transfer on either i) the value transferred or ii) the fraction of the income transferred. First, if individuals anticipate that norms of reciprocity will be in place, they could behave strategically, under the expectation that this would allow them to claim more solidarity in the case of a negative income shock. Second, to study the extent of reciprocity actually present, we analyze transfers conditional on donor's past transfers.



The last motivation that we consider is norms of deservingness. In one additional treatment arm, in the third round we inform participants that others will have the option to condition their donation according to the earnings they lost. This informational condition could result in an increase of exerted effort if participants anticipate more solidarity toward more industrious participants. But it could also generate a disincentive to work if participants anticipate that others would expect higher transfers (Jakiela and Ozier, 2016).

We found that solidarity is a common behavior among children and on average 79 percent decided to help others. Yet, transfers were low and participants only share an average of 17 percent of their endowment. The probability of helping others increased between the age of seven and 13 and remained rather stable for older children. Additionally, we find that social image concerns are relevant motivations for sharing only for adolescents. Lastly, we found that there is positive reciprocity in older cohorts but not for the youngest. Still, reciprocity norms are rather weak as there is a low correlation between the value sent and the value transferred in previous rounds.

The empirical evidence suggests that risk sharing is restricted to networks of family and neighbors (de Weerd and Dercon, 2006; Fafchamps and Gubert, 2007; Goldstein et al., 2005). This suggests that norms of altruism and the possibility to enforce reciprocity play an important role in risk-sharing networks. We contribute to the empirical literature studying this motivation for risk-sharing.

The closest to our paper are Leider et al. (2009) and Ligon and Schechter (2012). Similar to them, we consider the relative importance of different social preferences on giving. Yet, unlike those papers, we can explicitly distinguish whether giving is motivated by reputation or reciprocity motives. In our experimental design, participants receive information on the behavior of others and can react to this information by conditioning their help.

Development of social preferences in children has been studied extensively in both psychology (Eisenberg et al., 1991; 2005) and economics (Harbaugh et al., 2001, 2003a, 2003b; for a recent review of the experimental literature see Sutter et al. (2019)). On one hand, studies indicate that the older the participants are, the larger the proportion of income transferred in dictator games and in public good games (Bettinger and Slonim, 2006; Gummerum et al., 2010; Brocas et al., 2017; Chen et al., 2016b; Sutter et al., 2018; Angerer et al., 2015b), the larger the proportion of egalitarians (Fehr et al., 2008; Almås et al., 2010; Bauer et al., 2014; Martinsson et al., 2011) and lying-averse individuals (Maggian and Villeval, 2016). On the other hand, studies in psychology have shown a non-linear trend between prosocial preferences and age, particularly simple prosocial tendencies such as helping and sympathy (Carlo et al., 2007; Eisenberg et al., 2005; Crone and Dahl, 2012). Studies by Banerjee (2002, 2012) and Engelmann et al. (2013) observe reputational concerns and strategic behavior as motivations among young children aged between four to nine. Additionally, Eisenberg and co-authors found that there is a decrease in hedonistic motives after the age of 12 and argue that prosociality is driven by sympathy and need-based giving (Eisenberg et al., 1991; 2015). The contrasting results can be attributed to two reasons; namely the short age span of the studies (focusing on pre or post-adolescence). Second, the bidirectional nature of the relationship between age and prosocial disposition since most of the studies use cross-sectional data (Carlo et al., 2015; Van der Graaff et al., 2018). Our

contribution to these studies is in the form of a three-year longitudinal study observing children between the age of seven and 17 years. Furthermore, our research design which is a modified three-player solidarity game of [Selten and Ockenfels \(1998\)](#), unlike the dictator game, creates a context wherein the decision is clearly related to helping a participant who suffered a negative income shock. Finally, we are able to capture various motivations for risk sharing while retaining the public good character of giving ([Bolle et al., 2005](#)).

Previous studies also considered the stability of social preferences in adults (e.g., ([Chuang and Schechter, 2015](#); [de Oliveira et al., 2012](#); [Carlsson et al., 2014](#))). Yet, relatively few papers have used longitudinal data to study the development of social preferences of children and adolescents. [Deckers et al. \(2015\)](#) show that there is a high stability in giving for 7- to 10-year-old children. [Eisenberg et al. \(1991, 2005\)](#) observed an increase in prosociality among children over a 11-year time frame. They ascribed that moral reasoning for empathy-related responses are a key predictor of increasing prosociality over time. A recent six-wave longitudinal study by [Van der Graaff et al. \(2018\)](#) for children aged 13 to 18 also paid tribute to higher moral reasoning and perspective, taking increasing prosociality as the main drivers. [Carlo et. al \(2007, 2010\)](#) observed 700 children in a middle income neighborhood in Spain and Eastern United States over a period of three years and found that the initial presence of prosociality both in terms of cognitive reasoning and parental influence to have a strong positive impact on adolescents' prosociality in the future. Their study supports the internalization of motives and cognitive development as key roles in the development of social norms in children ([Fabes and Eisenberg, 1998](#)). However, similar to the cross-sectional studies, the few longitudinal studies have a short age span, mostly specific to mid and late adolescence. We extend this line of analysis considering a longer age range (7- to 17-year-olds) to capture the critical age at which social preferences might change. Following an approach similar to [Malti et al. \(2012\)](#), we study social preferences over time for different cohorts. In addition, we consider different forms of prosociality, such as altruism, reciprocity and deservingness, and observe the stability (or the lack thereof) of these social preferences.

Particularly in the psychology literature, the role of external circumstances in the form of peer and parental influences has been prominent. Parents, teachers, and peers affect social preferences ([Almås et al., 2017](#); [Deckers et al., 2015](#); [Ben-Ner et al., 2017](#); [Ottoni Wilhelm et al., 2008](#); [Banerjee, 2002](#)) and children from households with better socioeconomic conditions display more prosociality ([Deckers et al., 2015](#); [Chen et al., 2013](#); [Eisenberg et al., 2006](#)). Similar to those papers, we measure the altruistic preferences of parents and consider the economic conditions of children by comparing the social preferences of children from different socioeconomic backgrounds.

This paper is divided into six sections. In Section 2.2, we present a review of the related experimental the literature. Section 2.3 presents the experimental design and procedures. In sections 2.4 and 2.5, we present the data and results. In Section 2.6, we discuss our results and present our conclusions.

## 2.2 Related experimental literature

In recent years, an increasing number of papers have implemented economic experiments on risk sharing. Our experiment closely follows the “solidarity game” by [Selten and Ockenfels \(1998\)](#). In this three-person game, subjects can either receive a positive payment with a two-third probability or no payment with a one-third probability. Before knowing the outcome, participants decide on the amount that they would like to transfer in case they do not lose their payment and one of the other two players loses her payment. They found substantial solidarity and 79 percent of the participants sent a positive conditional transfer. They identify that the most common behavior is to transfer an equal value to each participant independent of the number of losers. The value sent increased with the number of losers for 61 percent of the participants.

[Costard \(2011\)](#) extended the solidarity game, allowing participants to select between two lotteries with the same expected payment but a different probability of losing. They find that risk-takers receive fewer transfers than those who select the safer option. Furthermore, they show that participants exhibit more solidarity to those with similar risk preferences. Similar results on self-inflicted neediness are reported by [Bolle and Costard \(2015\)](#), [Trhal and Radermacher \(2009\)](#), [Cettolin and Tausch \(2015\)](#), [Lenel and Steiner \(2017\)](#), and [Attanasio and Pavoni \(2011\)](#). Yet, [de Oliveira et al. \(2014\)](#) show that participants who prefer not to insure, increasing their neediness, receive the same conditional gifts as participants who opt to insure. In this paper, shocks are endogenously determined and bad luck cannot be attributed to participants therefore we do not assess the role of self-inflicted neediness. Instead, close to [Eberlein \(2008\)](#), we consider how performance in a real effort task affects solidarity. Our analysis focuses on the perceived deservingness of the beneficiary.

Few papers have examined the motivations for giving in the solidarity game. [Bolle et al. \(2012\)](#) elicited donations of two benefactors toward one beneficiary, allowing participants to condition their donation on the value donated by the other benefactor. This allowed them to identify warm-glow, pure altruism or guilt, as these preferences are consistent with constant, decreasing or increasing conditional donations.<sup>1</sup> They found that most of the participants could be classified as altruistic followed by two forms of guilt. [De Beer and Berg \(2012\)](#) use a four-person solidarity game to elicit motivations for giving associated with self-interest, fairness (reciprocity), neediness, and meritocracy. They find supporting evidence confirming those motivations. Similar to those studies, we use a within-subjects variation of experimental conditions which allows us to capture different motivations for giving per individual.

The closest to our experimental design are [Leider et al. \(2009\)](#) and [Ligon and Schechter \(2012\)](#) who used dictator games to investigate motivations for giving. Subjects make multiple transfer decisions that vary i) the anonymity of the recipient, and ii) the value of the transfers. [Leider et al. \(2009\)](#) find that transfers are 52 percent larger to close friends compared with strangers. When decisions are public, participants increase transfers toward friends relative to strangers, suggesting that norms of reciprocity favor prosocial behavior. [Ligon and Schechter \(2012\)](#) uses four dictator games to elicit altruism toward an anonymous person, altruism toward friends, generalized reciprocity, and enforced reciprocity (social sanctions). They find that the most

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<sup>1</sup>Envy is associated with other forms.

important motive for giving to an anonymous person is altruism. Changes in the informational conditions that allow altruism toward friends, reciprocity motives or social sanctions do not affect the average transfers significantly. This suggests that full insurance and models of limited commitment fit the data best.

Other experiments have examined the efficiency of risk sharing. For example, [Barr and Genicot \(2008\)](#) allow participants to select among six gambles that vary in terms of expected return and riskiness. This control condition is compared to three treatments in which participants have the option to form a risk-sharing group before selecting the gamble. The treatments vary the degree of commitment and information that participants receive. Participants in the commitment treatment pool earnings in the gamble and share equally the earnings among group members. In the information treatment, after receiving information on the outcome of the gamble, participants could opt out of the agreement. In one of the conditions the participant opted out secretly while in the other she opted out publicly. The participant who opted out received her individual payment, while the remaining participants pooled the risk. They find that under the exogenous commitment contract, participants take more risk and receive higher payments than in the condition with limited commitment. Public information on the defection of risk pooling decreases risk-pooling compared with the condition of secret information. This suggests that there are either costly enforcement mechanisms in place or that individuals avoid temptations to default the risk-sharing network and experience public shame thereafter. [Barr et al. \(2012\)](#) find supporting evidence for this and identify that public information on defection decreases risk sharing with members of the same cooperative group. This is probably due to more being lost from defecting publicly on the agreement.

[Charness and Genicot \(2009\)](#) extend this line of research using a two-person game in which one of the two participants is randomly selected to receive a positive income shock. After observing income, each participant decides on the value of a non-negative transfer to the other person. Simulating infinite interactions, the groups are matched for an uncertain number of rounds. In addition, only one round is selected for payment. They find supporting evidence of risk pooling, as the “lucky” participants send larger transfers. They find that transfers increase with risk aversion and continuation probability.

Lastly, a recent paper by [Jain \(2015\)](#) observes the impact of monitoring effort on informal risk sharing. She finds that when individuals obtain information on the effort levels of their matched partner, the proportion of people who contribute to the mutual insurance increases. In our case, we are able to disentangle not only the deservingness (effort levels of recipient) but also the intrinsic motive of reciprocity by providing information on the recipient’s history of previous transfers.

## 2.3 Experimental Design and procedures

### 2.3.1 Experimental Design

To simulate an informal risk-sharing network with limited commitment, we implemented a modified version of the solidarity game by [Selten and Ockenfels \(1998\)](#). Participants were randomly selected to form groups of three members. The group composition was anonymous and

remained constant throughout the session. Each participant completed a real effort task, and received a piece-rate payment. To simulate the effect of negative income shocks, the earnings of a randomly selected participant was lost. Before receiving information on who had lost their earnings, similar to [Schildberg-Hörisch \(2010\)](#), each participant decided under the “veil of ignorance” how much of their earnings they wanted to transfer to the loser. Participants took this decision over four rounds. This allow us to explore the effect of privacy of the decision on giving. Following [Ligon and Schechter \(2012\)](#), we randomly selected one of the four rounds for payment at the end of the session. In this way, we increase the impact of a positive transfer on participants earnings. To avoid income effects, participants did not receive feedback on income shocks between rounds (i.e., when players decided how much to transfer) they did not know which of them had lost the endowment. Only at the end of the session, once the fourth round was completed, one round was randomly selected for payments and participants were also informed of whether they had lost their payments or not.

We implement this game for two reasons. First, in this game individuals face a situation where they can show their willingness to help other individuals who are in need, i.e., it resembles a situation where unexpected hardships occur; for instance, unemployment, natural disasters, among others. Second, the game is simple which facilitates understanding, especially for younger children.

Each round of the game has a common structure of two stages. In the first stage, participants perform a real effort task and received a payment based on individual performance,<sup>2</sup> which entitles individuals to these earnings and avoids ‘house money’ effects ([Thaler and Johnson, 1990](#); [Cherry et al., 2002, 2005](#)). On the screen of the tablets, 30 slider bars were displayed, and participants were asked to position as many slider bars as they wanted exactly in the middle of each bar within 120 seconds. They received information on their individual performance as well as the time left for the task. Participants received 500COP (0.16USD)<sup>3</sup> for each slider bar that they could move at exactly 50 – maximum income possible was 15,000COP (4.91USD).<sup>4</sup>

Each participant received payments from the research assistants using play money. Children received a combination of bills and coins, such that they could transfer any value multiple of 500COP. We use tangible endowments to trigger a ‘cash-in-hand’ situation ([Reinstein and Riener, 2012](#); [Brandts and Charness, 2000](#)). Subsequently, participants had two envelopes per round; in one envelope they had to insert the amount of bills and coins that they wanted to transfer in that round, and in the other they put in the amount that they wanted to keep for themselves. Finally, they had to register their decisions on the tablets. We verify that the values registered on the tablets were consistent with those from the envelopes. We did not find any statistically significant difference between the two values. Thus, payments were calculated based exclusively on the information collected on the tablets.

<sup>2</sup>The task is an adaptation of the experiment by [Gill and Prowse \(2012\)](#) (see a test of this method in [Gill and Prowse \(2013\)](#)).

<sup>3</sup>Average exchange rate in 2016 was 3054.12COP per 1USD (Source: The World Bank).

<sup>4</sup>25.13% of participants (649 children) could place all the bars at 50 within 120 seconds and received the maximum amount. Mean value earned in the effort task was 11200COP (std. dev. 3,437COP; median 11,500). These payoffs in the game represent a higher amount than the weekly pocket money that children reported which was on average 10,000COP (3.27USD). Furthermore, the daily minimum wage in Colombia for 2016 was 22,981.40COP (7.52USD) (Source: <https://www.salariominimocolombia.net/en/>).

In the second stage of the game, one member of the group was randomly selected and lost all her endowment. The other participants decided how much of their endowment wanted to transfer. We used the strategy method and allowed all participants to behave as donors and only at the end of the experiment was it revealed who had lost their endowment, and their decisions were implemented. To facilitate mental calculations, each transfer was restricted to a multiple of 500 COP. Furthermore, instructions were explained using neutral phrasing in order to avoid framing effects, e.g., instead of ‘donation’ to refer to the amount transferred, we use the word ‘pass,’ which does not imply charitable giving.

To disentangle the solidarity motives in risk-sharing groups, we used a between-within subject design that varied the degree of privacy of the transfer and the extent to which participants could react to it. We implement a control treatment where information about decisions in the game remains anonymous over the four rounds, and three treatments where the first round is anonymous, but after the second round information on the private decisions in the game are revealed to other members in the group (see Table 2.1).

TABLE 2.1: Informational conditions for experimental treatments

Treatments	Round 1	Round 2	Round 3	Round 4
<b>T0</b> <b>Control</b>	Anonymous	Anonymous	Anonymous	Anonymous
<b>T1</b> <b>Transfers</b>	Anonymous	Info. transfers	Unconditional / Cond. on transfers	Unconditional / Cond.
<b>T2</b> <b>Earnings</b>	Anonymous	Info. Earnings	Unconditional / Cond. on Earnings	Unconditional / Cond. on Earnings
<b>T3</b> <b>Transfers/Earnings</b>	Anonymous	Info. transfers and earnings	Unconditional / Cond. on both	Unconditional / Cond. on both

In all treatments, decisions in the first round were made anonymously, i.e., what they received in the effort task and decisions on donations are private information. At the beginning of the second round, before starting the real effort task, it was announced that information on their decisions in that round would be public knowledge among members of each group, which allowed us to elicit social image concerns and strategic behavior. Nonetheless, the treatments varied which type of information was known.

In the third round, participants could react conditioning their decisions on the behavior of others. They made two types of transfer decisions: an unconditional transfer decision that was independent of others’ behavior and a conditional transfer that could vary according to the behavior of others. Both decisions were payment-relevant and, if that round was selected for payments, the unconditional donation determined the payoff for one of the donors and the conditional decision for the other – which decision counted for whom was randomly determined



at the end of the game. Additionally, in order to capture any possible end game effects, children played a fourth round under the same conditions as the third round.

## Treatments

The treatment conditions vary the type of information that was public after the first round.

**Baseline Treatment (T0):** Players' decisions remained anonymous throughout all rounds, i.e., in each group, no one knew the amount earned or transferred by others.

Since participants made decisions anonymously, donations in the first round of this treatment can be considered to be driven mainly by altruistic preferences. In addition, observed changes in the behavior of the participants over rounds allow us to elicit learning effects between rounds.<sup>5</sup>

**Transfers Treatment (T1):** In this treatment condition, we announced at the beginning of the second round that information about their donations would become public knowledge within their group members. Yet, other participants cannot react to this information changing donations. We hypothesize that if children care about creating a positive social image and anticipate the reputational effect of this decision, they would increase their transfers compared to the control group. In the third round, participants could condition their transfer decision on the amount sent by others. We expect that children reciprocate prosocial behavior by sending higher transfers to those that transferred more in the past. To elicit end game effects, the last round had the same rules as the third round.

**Earnings Treatment (T2):** Before the second round starts, participants were informed that their income in that round would be known by other members of the group in the following round. This change in the game rules allows us to elicit how strong image creation concerns are. We expect that if children were motivated to create an image as 'hard-workers' they would perform better in the real effort task. In the third round, participants had to decide the amount of their earnings to transfer, conditional on the amount earned by the recipient in the previous round. We implemented a strategy method to collect conditional decisions – in this round we elicit deservingness, which means that individuals could offer more help to more industrious players if they believed industrious participants deserve more help. Finally, participants played the last round under the same conditions as in the third round.

**Earnings and Transfers Treatment (T3):** In the second round, we informed participants that their earnings and what they transfer in that round would be known by other members of the group. In this second round, if they were concerned about generation a positive social image as a 'supportive person' toward others, they would transfer a higher proportion of their endowment. In the third round, participants made their transfers conditional on what the recipient transferred and earned in the previous round, i.e., we elicit reciprocity. The last round had the same conditions as the third round.

Last, before participants made decisions in the game, we evaluated the understanding of the rules using a set of control questions. At the end of game, all participants were informed about the selected round and their payments. Afterwards, they answered a questionnaire about children's socio-demographic information and also on social capital.

<sup>5</sup>We refer to learning as the effect of experience in the task, rather than update of beliefs.

### 2.3.2 Development of prosocial motives: Hypothesis

In our hypothesis, we propose two transmission channels that can impact motivations to engage in prosocial behavior and risk sharing; namely inter-generational transmission and socialization through the influence of adults and peers. We expect that children who experience more altruistic environments, in terms of not only receiving help but also offering help, will tend to be more altruistic in the experiment. This evidence supports socialization theory wherein the older cohorts who, by virtue of their age, experience more interactions with others, and have had more chances of offering help and of being altruistic toward others compared to the younger cohort (Harris, 1995; Grusec and Hastings, 2014). In cross-sectional studies, it is found that as children grow older they are more aware of concepts such as fairness, distribution concerns, and the presence of multiple donors, which is reflected in a higher prosociality among older children compared to younger cohorts (Habibpour et al., 2018; Fehr et al., 2008; Benenson et al., 2007; Guzmán et al., 2014). These findings are supported by the socialization theory, which theorizes that as children grow older they can experience social situations with their peers where help can be offered and received, i.e., helping behavior is not rare for older children, as a consequence it might promote the instauration of a social norm to help (Harris, 1995; Grusec and Hastings, 2014). Furthermore, according to previous studies, in adult populations, prosocial behavior is relatively stable in a different contexts (Carlsson et al., 2014). As a result, we expect adolescents to behave as adult populations do, i.e., their prosocial behavior should become more stable as they grow older. To test this hypothesis, we not only compare the behavior of children from different age groups in an anonymous decision, where helping behavior is motivated by altruism, but also whether this prosocial behavior changes over time for the same individuals, we use our longitudinal set-up which is constructed over three consecutive years.

Social external forces might influence individual behavior. For instance, according to sociology and psychology literature, these social external forces can foster or deter prosocial behavior and cooperation among individuals (Simpson and Willer, 2015). Moreover, there is evidence that the importance of others' opinion about own self is higher for older children (Banerjee, 2002; Engelmann et al., 2018). One reason for these increasing in importance is by the fact that children behave more strategically as they grow older. Moreover, social image concerns are also found to be more relevant when their behavior will be made public, e.g., announcing contribution publicly to the classroom might increase prosocial behavior (Chen et al., 2016a). In our study, we expect that children from older cohorts care more about their social image, and also that these concerns are more salient for pre-adolescents due to the socialization with their peers. Particularly emphasized in the sociology literature, is the importance of social external forces that have pervasive effects on cooperation and prosocial behavior (Simpson and Willer, 2015). Furthermore, these image concerns might be more important for older children as they are more aware of being evaluated socially (Banerjee, 2002; Engelmann et al., 2018).

Lastly, sharing can be motivated by strategic reasons among children and adults (Leimgruber, 2018). Based on results from dictator games that elicit conditional cooperation (Brocas et al., 2017; House et al., 2013) and psychological tests (Brosig-Koch et al., 2012; Sher et al., 2014; Czermak et al., 2016), it is found that the under-sevens take decisions to receive an immediate reward instead of receiving a larger reward in the future (myopic) and their capacity for



thinking strategically is still not well developed. However, with age the development of socio-cognitive ability enables older children to think more logically and strategically. Using trust games, Harbaugh et al. (2003b) and Sutter and Kocher (2007) found that children even in childhood reciprocate prosocial behavior of their partners. However, compared to adult subjects, the reciprocity of children and adolescents is smaller, but positively correlated with age. In our subjects of 7- to 18-year-olds, we expect adolescents' behavior to be more akin to adult populations, i.e., adolescents might reciprocate more than children.

### 2.3.3 Experimental Procedures

The experimental sessions took place between August and November in 2016, 2017, and 2018. We conducted the sessions in two private middle- and two public low-income schools located in Bogota, Colombia. The experimental game and questionnaires were programmed using the open-source software *oTree* on tablets (Chen et al., 2016a).

We randomly contacted several schools in 2012, and ran the sessions only in those schools where we received approval of our study by the principals. In these schools, children can study from the first grade of elementary school until the 11th grade of high school in the same facilities. This allowed us to collect data in three consecutive years with most of children and to evaluate the development of their motives for sharing over time. Although we can repeat the sessions with most of the students that participated in 2016, we cannot implement the same treatments for all of them because children shuffle groups from one year to another. Thus, before we start the sessions, we verify the number of children that participated in each treatment the previous year, so that the treatment with the highest number of children was implemented. In 2016, 1666 children participated in the experimental sessions (see Table 2.1). The following year, 1304 children of them could participated in the experimental sessions, and additionally 391 children participated for the first time. The last year, 550 children participated all three waves, 131 participated only the last two waves, and for 227 children it was the first participation.<sup>6</sup>

Private schools offer a full-day schooling while public schools have two shifts, one in the morning and the other in the afternoon. To collect more comparable data between the two types of schools, we ran all sessions only in the morning during regular school hours, and each session lasted approximately one and a half hours. On average, there were three classrooms per grade in each school with 20 to 30 students in each group. The treatment assignment was done randomly at the classroom level, so that we could implement at least three treatments in the same grade per each school. In order to lessen spillovers between children of the same grade, we scheduled three sessions the same day to collect the information of all groups per grade.

Teachers were informed of the schedule of activities, so that they could adjust their regular teaching hours. Furthermore, parents were sent a letter from us with information on the main objective of our study and children's payments. They were also informed that participation was voluntary and that they could refuse their child's participation.<sup>7</sup>

In all sessions, one research assistant read the standardized instructions out loud, so that

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<sup>6</sup>The attrition from 2016 to 2017 was around 30%. This is explained by dropout rates and the high mobility of students between schools, especially in public schools.

<sup>7</sup>We received, in total, four denials from parents.

participants from different sessions received the same information, as a result, we are able to compare results across sessions (see Section 2.8 for experimental instructions). Children knew that their participation was voluntary and they could abandon the session at any moment. We also informed them that they were not allowed to interact with their classmates during the session and all the collected information would be anonymously managed and analyzed. At the end of the game, participants were asked to answer a post-experimental questionnaire that included basic socio-demographic data and social capital questions (see the complete questionnaire in Section 2.8).

After the session ended, participants received a voucher equivalent to their payments that they could redeem at the school store, which included their payments calculated from the game and a participation fee of 1,500COP (0.51USD). The children did not at any time receive an actual cash amount.

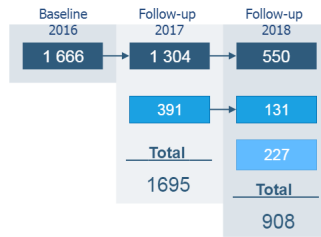


FIG. 2.1: Sample size per year

## 2.4 Results

In this section, we present our main results from the economic experiments. First, we describe the characteristics of our sample and children’s prosocial behavior. In the first part of the analysis, we analyzed whether altruistic preferences are stable over time. To achieve this, we considered only transfers in the first round, which indicates altruistic preferences, since there is no previous behavior to contemplate and decisions were made under anonymity. Furthermore, we analyzed whether sharing is motivated by reputation, image concerns, or strategic behavior. At this stage, we estimated treatment differences that could have occurred due to changes in the game rules over rounds. Last, we examine conditional transfers that indicated whether children exhibited reciprocal behavior.

### 2.4.1 Descriptive Statistics

This longitudinal study includes data collected in a baseline and two follow-up years. Table 2.2 summarizes the socio-demography information of our sample in each wave. In the baseline, girls represent 43 percent of participants. On average, children are 13 years old, have three friends in the classroom, 25 friends in total, have visited around two schools, and had been in the same school for five and a half years.

An average household has six members, with three children. In one third of households, parents live together and almost all parents work (96 percent of fathers, and 81 percent of mothers). More than one third of the households (38 percent) have faced a difficult economic

situation in the last month, and 65 percent of the time receive help from other families, and only 10 percent of the time receive help from the state.

In the post-experimental questionnaire, children answered some questions about their social capital. Helping behavior is common for half of them, either helping family members, other families or the community. At schools, 63 percent of them had participated in socio-cultural activities. Around 72 percent of children preferred to cooperating to competing. Moreover, 65 percent of them trusted their friends and only 28 percent had trust in other people.

The treatment assignment was implemented at the classroom level, i.e., each group per grade was assigned to one of the treatments. This assignment procedure guaranties that all treatments were assigned for every age group within the school. In the baseline, 2016, we found that our sample is balanced across treatments across most of the socio-demographic characteristics, except for age, where the control group is the youngest group, and father's employment status (see Table 2.8 in the Appendix).

In the baseline and in the first follow-up, around 1,660 children from four schools participated. In the last follow-up, we conducted experimental sessions in only three of the initial schools, and we gathered information from 911 participants. Due to a high children mobility between public schools and dropouts, the attrition rate in our sample is around 30 percent from one year to the next (see the Appendix, Table 2.1).

Table 2.3 summarizes the results of the children's decisions in the solidarity game over the three years. On average, during the game they received for the real effort task around 11,110COP (SD=173.2). We found that prosocial behavior is quite frequent among children with 89 percent of them deciding to transfer part of their endowment. In comparison, in experiments with adults, they found that more than only two thirds of participants exhibited prosocial behavior to some extent, for instance, [Selten and Ockenfels \(1998\)](#) found that 79 percent of participants in their study were not completely egoistic and transferred a positive amount.

In our sample, children transferred 1,850COP (SD=100) which is equivalent to approximately 17 percent of their endowment. This result is slightly lower than similar studies with adults, e.g., [Bolle et al. \(2012\)](#) found that participants gave away 23 percent of their endowment.

Lastly, participants in our sample underestimated what their partners received, 8,590COP (SD=200), and overestimated what their partners transferred, 2,200 (SD=141). Moreover, the proportion of children who followed a re-distributive equity principle, i.e., transfer between 30 to 36 percent of their income, is only 6.79 percent.

### 2.4.2 Empirical Strategy

In this section, we present the econometric models used to evaluate pro-social behavior in the game.

#### Altruism

In the next model, we estimate how the reduction of asymmetric information within groups affects prosocial behavior. In order to control for unobserved time-invariant individual characteristics, we exploit our panel database to improve our results. We estimate fixed and random effects

TABLE 2.2: Summary statistics

	2016		2017		2018	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
<b><i>Panel A: Children characteristics</i></b>						
Age	12.94	2.71	13.92	2.71	14.28	2.41
Female	0.43	0.50	0.44	0.50	0.49	0.50
Number of attended schools	2.02	2.89	1.99	1.44	2.15	1.49
Years in the current school	5.48	3.34	6.09	3.47	5.95	3.47
Years with the same group	3.63	3.04	3.14	2.63	3.38	2.83
Friends in the classroom	2.81	0.84	2.90	0.83	2.82	0.88
Total friends in general	24.88	37.43	22.36	34.14	20.99	35.14
Low SES school	0.55	0.50	0.57	0.50	0.90	0.30
Work in the last month	0.25	0.43	0.25	0.43	0.26	0.44
Help household members in the last month	0.69	0.46	0.76	0.43	0.78	0.41
Helped other families in the last month	0.43	0.49	0.45	0.50	0.45	0.50
Helped community in the last month	0.50	0.50	0.50	0.50	0.45	0.50
Socio-cultural activities participation	0.63	0.48	0.69	0.46	0.59	0.49
Trust in friends	0.65	0.48	0.65	0.48	0.60	0.49
Trust in others	0.28	0.45	0.22	0.41	0.20	0.40
Cooperation better than compete	0.68	0.47	0.77	0.42	0.73	0.44
Others opinion about my helping behavior	2.26	0.56	2.27	0.53	2.24	0.54
Others help me	2.44	0.58	2.40	0.58	2.32	0.59
Importance of others' opinion about me	1.68	0.72	1.58	0.68	1.44	0.61
Forgiveness	2.57	0.55	2.53	0.53	2.51	0.55
<b><i>Panel B: Family characteristics</i></b>						
Family with both parents	0.59	0.49	0.56	0.50	0.45	0.50
Single parent family	0.38	0.49	0.42	0.49	0.53	0.50
Total household members	5.58	14.84	5.07	2.74	5.43	2.91
Total siblings	2.18	2.01	2.09	1.86	2.55	1.94
Father has a job	0.97	0.17	0.96	0.19	0.95	0.21
Mother has a job	0.82	0.38	0.83	0.38	0.79	0.41
father's education	3.30	1.43	3.35	1.46	2.50	1.19
mother's education	3.36	1.39	3.37	1.40	2.81	1.22
Father's age	44.30	9.51	45.15	9.05	43.36	9.55
Mother's age	40.06	8.33	40.70	8.04	39.36	7.71
Difficult economic situation in last month	0.38	0.49	0.40	0.49	0.47	0.50
Family helped others in the last month	1.24	0.67	1.24	0.66	1.14	0.67
Someone would help your family?	1.35	0.55	1.35	0.54	1.43	0.58
Help from other families or people	0.65	0.48	0.67	0.47	0.65	0.48
Help from the state	0.10	0.30	0.07	0.25	0.08	0.27
Observations	1666		1695		911	

Notes: This table includes all children that participated at least in one wave. Reference to values of the variables.

Parents education (1=some primary; 2=primary; 3=some secondary; 4=secondary; 5=some tertiary; 6=technical; 7=professional)

Use of touch-screen devices (1=never; 2=few days a month; 3=few days a week; 4=everyday)

Comprehension of rules (1=not at all; 2=good; 3=very good)

Difficulty of the task (1=very easy; 2=easy; 3=quite hard)

High income for myself/group (0=never; 1=sometimes; 2=always)

TABLE 2.3: Mean values of game outcomes across treatments - All rounds all years

	(1) T0	(2) T1	(3) T2	(4) T3	(5) Overall	(6) p-value
Earnings (1.000 COP)	10.73 (0.07)	10.99 (0.05)	11.56 (0.05)	11.06 (0.05)	11.11 (0.03)	0.00
Transfer (1.000 COP)	1.61 (0.03)	1.94 (0.02)	1.94 (0.03)	1.83 (0.02)	1.85 (0.01)	0.00
Positive transfer	0.85 (0.01)	0.90 (0.00)	0.91 (0.00)	0.89 (0.00)	0.89 (0.00)	0.00
Prop. of income transferred	0.15 (0.00)	0.18 (0.00)	0.17 (0.00)	0.16 (0.00)	0.17 (0.00)	0.00
Exp. earnings (1000COP)	8.57 (0.08)	8.30 (0.08)	8.96 (0.08)	8.58 (0.07)	8.59 (0.04)	0.00
Exp. transfer (1000COP)	2.22 (0.04)	2.32 (0.04)	2.20 (0.04)	2.15 (0.03)	2.22 (0.02)	0.03
Redistributive equity	0.05 (0.00)	0.08 (0.00)	0.07 (0.00)	0.06 (0.00)	0.07 (0.00)	0.00
<i>N</i>	2600	4444	4040	6004	17088	

Note: Standard errors in parentheses. Average results including final round. Sample includes all children who participated, even if they participated only one year.

models to evaluate altruism in the first round, as described in the following specification,

$$Y_{i,t} = \beta_0 + \beta_A \text{Age2016}_i + \beta_Y \text{Year}_{i,t} + \beta_{AY} \text{Age2016}_i \times \text{Year}_{i,t} + \beta_E \text{Earnings}_i + \beta_Z \text{Z}_{i,t} + \varepsilon_i + v_{i,t} \quad (2.1)$$

here,  $Z$  includes socio-demographic characteristics of children. We also evaluate altruism as a motive for helping, and test whether altruistic behavior changes over time, i.e., we test whether the coefficient for the variable  $\text{Age2016}^8$ , in Equation (2.1)  $\beta_A$ , is different from zero. Furthermore, because we can follow the same individuals over time, i.e., our sample is getting older in each wave, the average altruism would also be positively correlated with time. We expect  $\beta_Y$  to be larger than zero in case of increasing altruistic behavior. Last, the coefficient of the interaction term of age in 2016 and time  $\beta_{AY}$  estimates whether this average change in behavior is different across cohorts. If the development of prosocial behavior differs between children from different cohorts, e.g., between primary school children and secondary school adolescents, then the coefficient  $\beta_{AY}$  should be statistically different from zero. Similar studies with adult populations found that prosocial behavior is relatively stable over time (e.g, Carlsson et al. (2014)), in this vein, if we observe changes in behavior, these should be stronger for young children compared to adolescents, i.e.,  $\beta_{AY} < 0$ .

### Motives for giving: social image concerns and strategic behavior

Helping behavior can also be motivated not only by altruism but also by the self-interest of receiving future help in response to their own actions. To estimate whether the availability of

<sup>8</sup>This variable indicates the age of children in the baseline.

private information affects individual behavior in our setting, we use a difference-in-differences (Diff-in-Diff) model as follows,

$$\begin{aligned} Y_{i,t} - Y_{i,1} = & \beta_0 + \beta_A \text{Age2016}_i + \beta_T \text{Treatment}_i + \\ & + \beta_{AT} \text{Age2016}_i \times \text{Treatment}_i + \\ & + \beta_E \text{Earnings}_i + \beta_Z Z_i + \varepsilon_i \end{aligned} \quad (2.2)$$

In Equation (2.2), the left side measures how outcomes in the game,  $Y_{i,t}$ , change with respect to the first round,  $Y_{i,1}$ , where all decisions are anonymous. The coefficient  $\beta_{AT}$  of the interaction term ‘ $\text{Age2016}_i \times \text{Treatment}_i$ ’ estimates whether information received in about the behavior of others in each treatment affects game outcomes across different cohorts compared to the control group under anonymity of decisions. Should individuals be motivated to create a positive social image, they would increase their transfers and because private information about their decisions would be made visible to other members of the group. To explore whether this motivations for helping change over time, we include a time variable in the analysis, which will be explained in the following section.

### Reciprocity and deservingness

Finally, conditional transfers that participants could make conditioned on recipients’ behavior in previous periods indicate whether reciprocity and deservingness are important motives for helping in a risk-sharing group. We estimate these effects by implementing the following model by treatment,

$$\begin{aligned} Y_{i,t} = & \beta_0 + \beta_{PB} \text{PrevBehavior}_{j,t-1} + \beta_A \text{Age2016}_i + \beta_Y \text{Year}_{i,t} \\ & + \beta_{PBA} \text{PrevBehavior}_{j,t-1} \times \text{Age2016}_i + \beta_{AY} \text{Age2016}_i \times \text{Year}_{i,t} \\ & + \beta_{PBAY} \text{PrevBehavior}_{j,t-1} \times \text{Age2016}_i \times \text{Year}_{i,t} \\ & + \beta_E \text{Earnings}_{i,t} + \beta_Z Z_{it} + \varepsilon_i + v_{i,t} \end{aligned} \quad (2.3)$$

Here,  $\beta_{PB}$  indicates an individual’s behavior in response to others’ behavior in a previous period, i.e., it estimates an average level of either reciprocity or deservingness. The coefficient  $\beta_{PBA}$  estimates whether there are differences across cohorts in the average reciprocity or deservingness. Last, the coefficient of the interaction ‘ $\text{PrevBehavior}_{j,t-1} \times \text{Age2016}_i \times \text{Year}_{i,t}$ ’,  $\beta_{PBAY}$ , estimates whether the level of reciprocity or deservingness is constant over time by each cohort.

To evaluate the marginal effects by each cohort, we estimate the derivative of Equation (2.3) with respect to a partner’s previous behavior,

$$\partial Y_{i,t} / \partial \text{PrevBehavior}_{j,t-1} = \beta_{PB} + \beta_{PBA} \text{Age2016}_i + \beta_{PBAY} \text{Age2016}_i \times \text{Year}_{i,t} \quad (2.4)$$

### 2.4.3 Behavioral Results

#### Altruism

To evaluate how altruism develops during childhood and adolescence, as mentioned in the experimental design, we repeated the experimental sessions over three consecutive years in the same schools and built a panel data set. We divided our sample into three cohorts according to children's age in the baseline to analyze how their decisions in the game change over time, and estimate the extensive and intensive margin of altruistic behavior.

We use our panel database to test whether social preferences change over time for the same individuals. We estimate random effects models as described in Equation (2.1) to evaluate altruism in the first round where all information about the decisions of others in the game is anonymous. We include in the econometric analysis children who participated at least in two years.<sup>9</sup> We estimate a random effects model with this unbalanced panel data to estimate altruism over time and differences across children of different cohorts.<sup>10</sup>

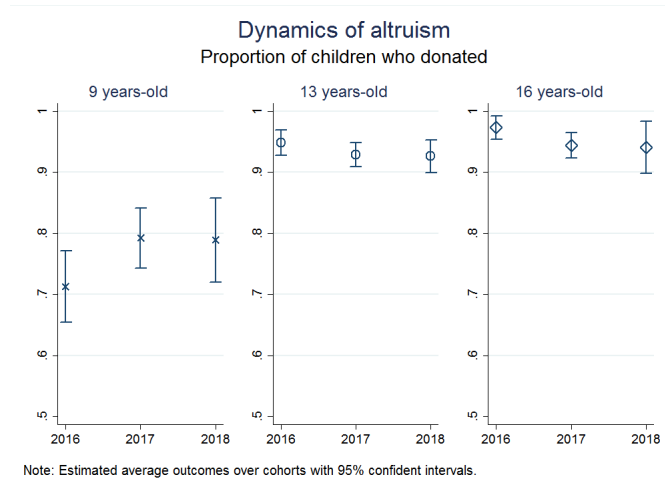


FIG. 2.2: Proportion of children who transferred in the first round

Following the random effects models, we estimate the development of both likelihood of a positive transfer and the proportion of earnings transferred. Figure 2.2 and Figure 2.3 show the estimation of marginal effects by cohort over time in the first round (see in Table 2.5). We find that there is an increase in this probability over time, in other words, in our sample the probability of behaving altruistic increases over time and this change is larger for the youngest cohort. Finally, we did not find any changes in the proportion of endowment transferred across cohorts over time.

As a robustness check, we divided the unbalanced panel into two groups. First, we consider a sample of children who exclusively participated over two years, e.g., they participated in 2016 and 2017 but not in 2018, or in 2017 and 2018 but not in 2016. We found similar results obtained using the unbalanced panel. We confirm that there is an overall increase in altruism over time, and this change is larger for younger children (Table 2.6 in the Appendix). Second, we consider

<sup>9</sup>We also include children that participated in two non-consecutive years, i.e., in 2016 and 2018.

<sup>10</sup>To estimate the model in Equation (2.1) we decided to use a random effects model because our sample cannot be pooled (Breusch-Pagan test,  $\text{Prob} > \chi^2 = 0.000$ ), and also a random effects model is preferred over a fixed effects model (Hausmann test,  $\text{Prob} > \chi^2 = 0.140$ ).

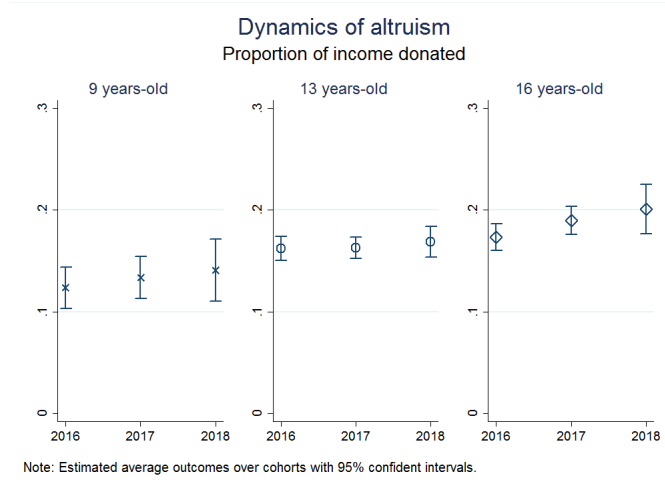


FIG. 2.3: Proportion income donated in the first round

a balanced panel with participants that we can follow over the three waves. In this case, we can analyze the information of the youngest cohort in our sample. The results of this analysis confirm that as children grow older they behave more prosocial (Table 2.7 in the Appendix).

### Cooperation and motives for helping: social image and strategic behavior

Giving can be motivated not only by altruism but also by others motives. Individuals might help others to create a social image of a prosocial person. They might also be motivated by the self-interest strategic motive of receiving future help in response to their own actions. To estimate whether availability of private information affects individual behavior in our setting, we use a difference-in-differences (Diff-in-Diff) model as in Equation (2.2). Coefficient  $\beta_{AT}$  of the interaction term ' $Age_{2016_i} \times Treatment_i$ ' estimates whether information about the behavior of others affects game outcomes across cohorts compared to the control group under anonymity.

We estimate the specification described in Equation (2.2) and the results of these models are displayed in Table 2.10,<sup>11</sup> here we examine change in behavior with different levels of public information about private decisions across rounds compared to the anonymous first round.

We include the time variable for each wave in specification of in Equation (2.2). We estimate whether there is change in social image concerns across cohorts over time (see Table 2.11). Figure 2.4 (in the proportion of children who transfer) and in Figure 2.5 (proportion transferred) display the estimated differences of behavior in the treatment T1-Transfers, where information about transfers will be known, between the second and first rounds compared to the control treatment.

In case that social image creation plays a role within groups, so behavior in the second round should be different compared to the first round because participants' decisions will no longer be private. We found that social image concerns are not a strong motive for changing helping behavior on average in our sample.<sup>12</sup> Thus, differences in outcomes are mainly giving by

<sup>11</sup>Treatment randomization was done at the classroom level. Table 2.8 in the Appendix shows orthogonality tests of observed individuals' characteristics in our sample for the baseline across treatments. Most of the characteristics are balanced, except for age, total number of siblings, and if the father has a job.

<sup>12</sup>We found a quickly positive effect for the middle cohort



a learning effect and altruism.

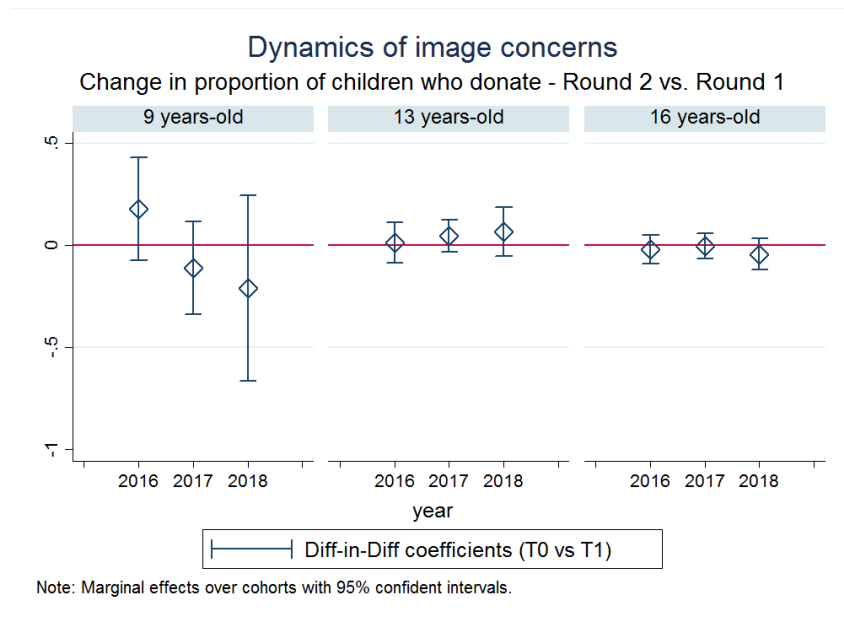


FIG. 2.4: Change in the proportion of children who transferred in the first two rounds

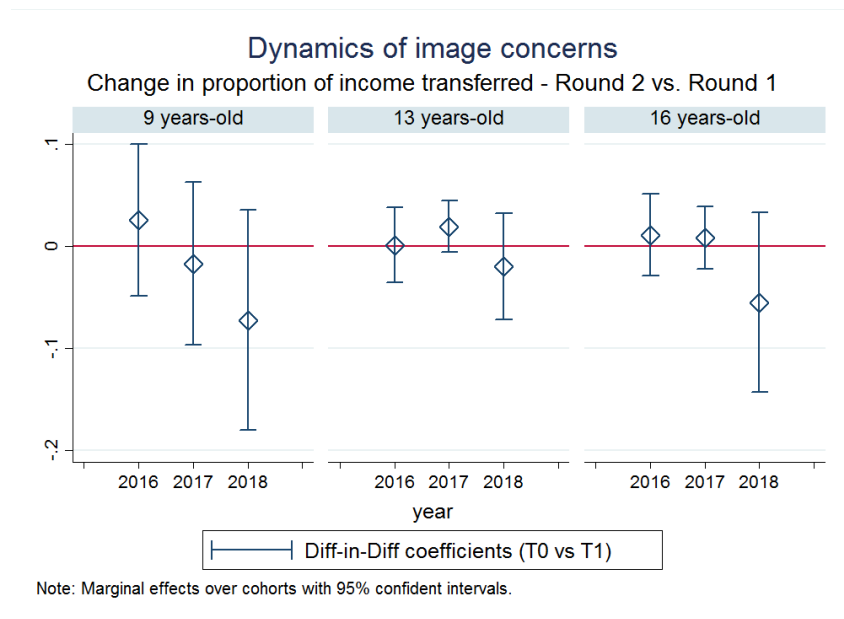


FIG. 2.5: Difference in the proportion of income donates in the first two round

Strategic transfer is calculated as the difference between the third round and first round on the proportion of children who transfer and proportion transferred. We estimate these differences in behavior comparing T1-Transfers and the control treatment where decisions are anonymous across cohorts over time. These estimated differences are displayed in Figure 2.6 and Figure 2.7. In this case, we are eliciting a combined effect of image concerns and the strategic behavior of participants. We did not find that the prosocial behavior is higher in the third round compared to the first round when their transfers are known by other members in the group. In conclusion, even in case that they could behave strategically to attract more future help, they are motivated

to help mainly by altruism in all cohorts (see Table 2.12).

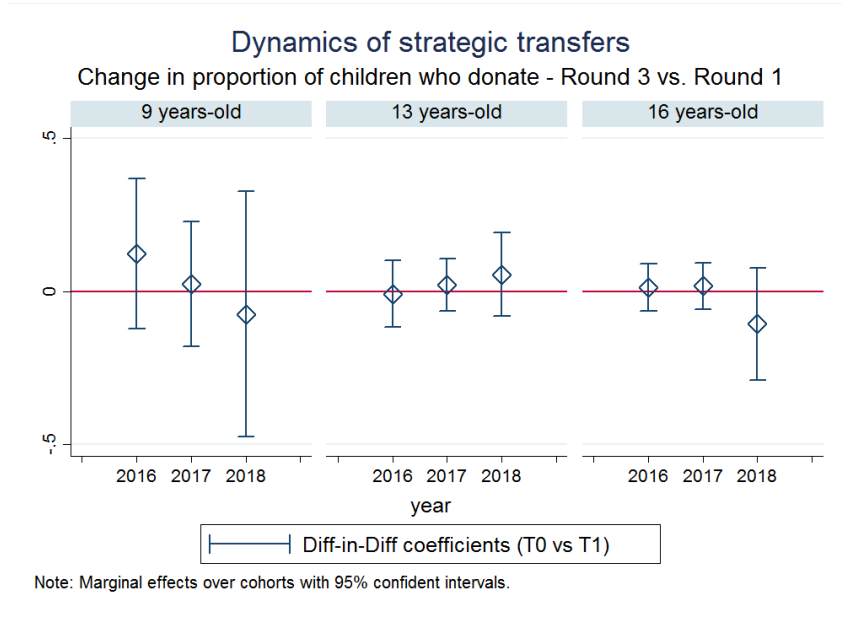


FIG. 2.6: Change in the proportion of children who transferred in the third round compared to the first round

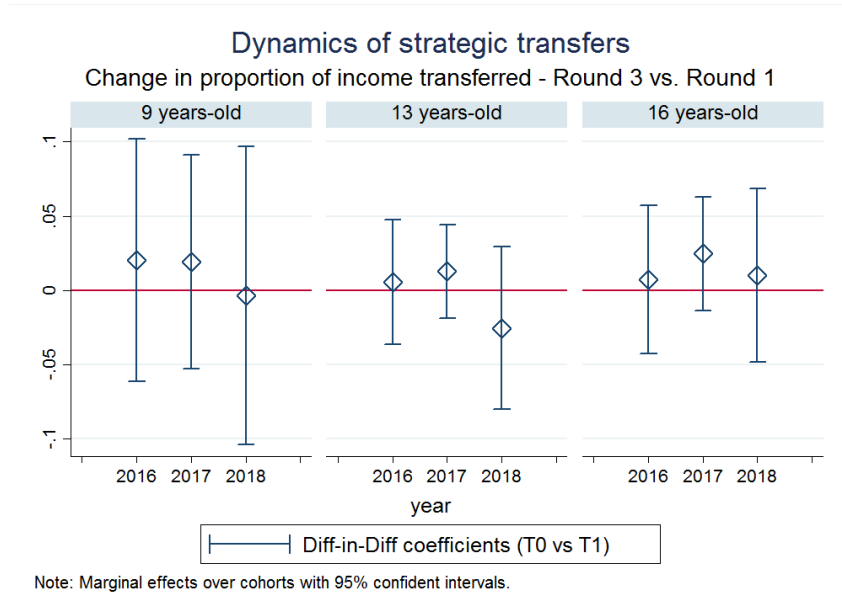


FIG. 2.7: Difference in the proportion of income donates in the third round compared to the first round

## Reciprocity

Finally, we evaluate transfers that participants could make conditional on other players' behavior in the previous period, i.e., we elicit reciprocity as motive for helping in a risk-sharing group. We estimate the model described in Equation (2.3) by treatment and calculate the conditional marginal effects (CME) with respect to the previous behavior of others described in Equation

(2.4). We use this conditional marginal effects to estimate reciprocal behavior over time across different cohorts. We expect that reciprocity would be more common behavior among older children, because they are able to better evaluate others' behavior when they are making decisions.

Based on Falk and Fischbacher (2006), reciprocity is defined as 'a behavioral response to perceived kindness and unkindness,' our design allows us to identify whether children reciprocate in the risk-sharing network. In the third round of treatment T1-Transfers, children can condition their transfer on the recipients' previous transfer. To evaluate all contingent scenarios, we use the strategy method, and test whether there is evidence of positive reciprocity, i.e., whether children transfer higher amounts of income to those who also helped more in the past.

In Table 2.13, we present the estimation described in Equation (2.3). Pooling the sample, we found positive reciprocity among children (column (1) in Table 2.13; 0,145\*\*\*). However, there is no evidence of 1:1 reciprocity<sup>13</sup>, i.e., children reciprocate less than proportionally to the prosocial actions of others.

To determine the dynamics of reciprocity as children grow older, we test the difference in behavior between different cohorts. To estimate any behavioral differences, we perform a conditional marginal effects analysis with respect to the previous transfers of others for the random effects model described in Equation (2.4). This model describes how the change in others' behavior in the previous period affects contemporaneous helping.<sup>14</sup> We found that 9-year-olds, the youngest cohort, did not reciprocate either in 2016 or in 2017. Conversely, we found positive and constant reciprocal behavior over time among older cohorts (see Figure 2.8). Reciprocity requires complex cognitive processes to evaluate how kind the actions of others are and how to respond to these actions. This could explain why reciprocal behavior is less observed in younger children. Another possible explanation is that interactions with others and socialization could foster reciprocity so that older children are more experienced in judging the actions of others.

## Deservingness

Within a risk-sharing network individuals could be motivated to cooperate accordingly to the deservingness of the recipient. In our context, deservingness refers to the extent at which a recipient merits to receive a transfer based on the effort they made. To evaluate whether individuals take into account recipients' deservingness when they decide how much to transfer, we implement a treatment (T2-Earnings) where children could transfer a player an amount to the affected player conditional on what this player had earned in the effort task in the previous round. We examine here whether children transfer higher amounts to those that earned more, i.e., whether they consider that the player who lost her endowment deserves more help if she also invested more effort.

Table 2.14 displays econometric results of this stage using the specification described in Equation (2.3). We did not find that recipients' deservingness change conditional transfers among

<sup>13</sup>We reject the hypothesis that the coefficient for reciprocity is equal to 1 (Wald test,  $p < 0.000$ ).

<sup>14</sup>Note that this derivative is the following:

$$\partial Y_{it} / \partial PrevBehavior = \beta_{PB} + \beta_{PBA} Age2016_i + \beta_{PBAY} Age2016_i \times Year_{it} \quad (2.5)$$

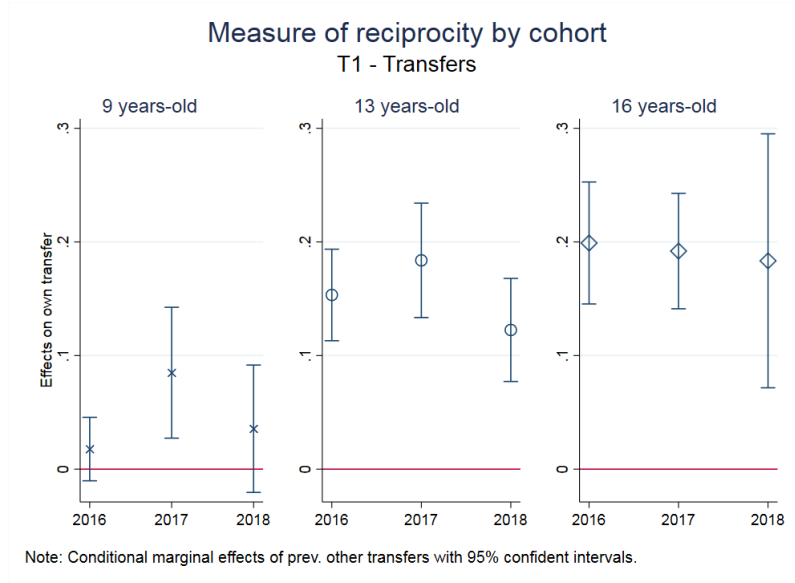


FIG. 2.8: Reciprocity

children (Column 1). To evaluate heterogeneity among children in our sample, we estimate a random effects model using the specification in Equation (2.4), which estimates the conditional marginal effects with respect to the previous earnings of other players to analyze differences in behavior across age groups. We found that children transfer the same amount of endowment regardless of the earnings of others, i.e., there are no differences in the importance of a recipient's deservingness between age groups (see Figure 2.9).

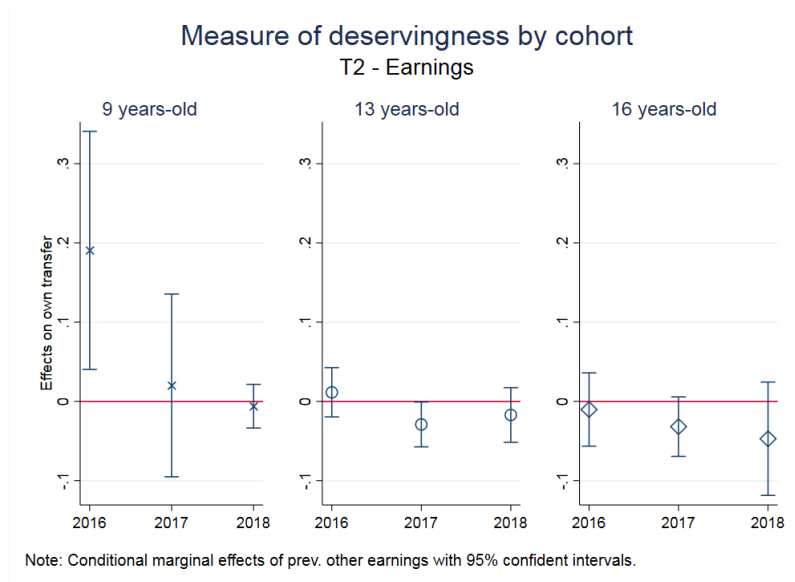


FIG. 2.9: Deservingness

### Reciprocity and Deservingness:

In risk-sharing networks, information about the behavior of others could affect individuals' behavior. In the previous sections, children could condition their transfers either on others'

previous transfers (reciprocity) or recipients' earnings (deservingness). In both cases, individuals received partial information about others' behavior. However, in neither case could individuals identify whether others had transferred more because they owned a higher endowment or because they were generous and transferred a larger proportion of their income. In conclusion, individuals could not estimate just how prosocial others were. Hence, we implement a third treatment in which both pieces of information about others' behavior are revealed.

Similar to other treatments, in treatment T3-Transfers/Earnings children could transfer part of their endowment conditional not only on what the player who lost their endowment had earned in the previous round but also on what this affected player had transferred. We estimate at what extent children's transfers are affected by knowing recipients' previous earnings and transfers using the specification described in Equation (2.3). In this treatment, we found that children reciprocated a recipient's previous help and transferred smaller amounts to those who earned more in the previous rounds (column (1) in Table 2.15, coefficient for reciprocity  $0.197^{***}$  and deservingness  $-0.028^{***}$ ).

From the conditional marginal effects analysis of the random effects model, we found two main results. First, positive reciprocity is driven by older children, and over time reciprocal behavior tends to decrease. Second, the amount of endowment transferred by children in the middle cohort is inversely proportional to recipient's earnings only in the first and second wave. In the last year there is no evidence of deservingness for any cohort (see Figure 2.10 and Figure 2.11 ).

Finally, Table 2.4 summarizes all estimated conditional marginal effects per treatment, cohort and year (from Figures 2.8, 2.9, 2.10 and 2.11 ). We test for statistical differences<sup>15</sup> between groups, and find that the oldest two cohorts are similar over time and they exhibit positive reciprocity. Moreover, the three cohorts are not different over time when we analyze 'deservingness', i.e., for almost all years, neither cohort take into consideration the recipients' deservingness of help based on their earnings.

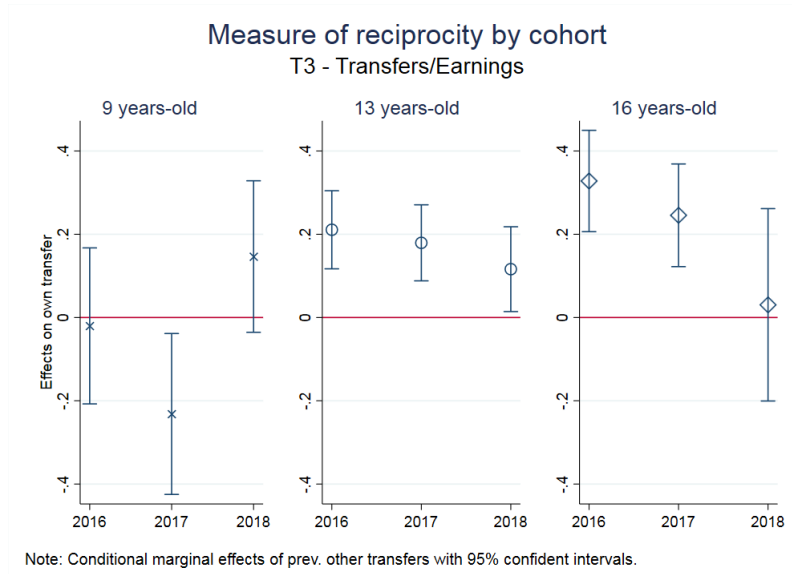


FIG. 2.10: Combined effect of other's transfers

<sup>15</sup>We use the Bonferroni method adjusted for multiple comparisons.

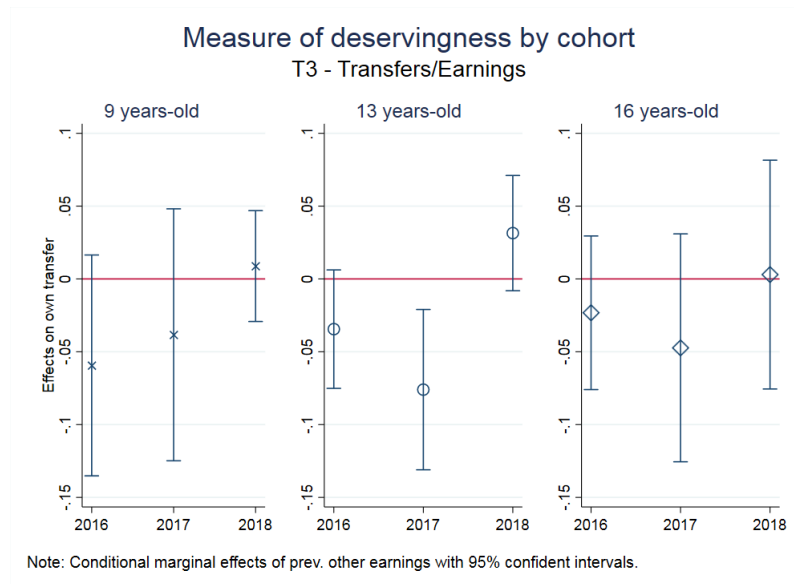


FIG. 2.11: Combined effect of other's earnings

TABLE 2.4: Conditional Marginal Effects for decisions in third round

	9-years-old				13-years-old			16-years-old		
	Year	dy/dx	Std. Err.	Group	dy/dx	Std. Err.	Group	dy/dx	Std. Err.	Group
Reciprocity (T1): Prev. transferred by other	2016	0.025	0.015	A	0.138***	0.013	BCDE	0.215***	0.021	F
	2017	0.088***	0.023	ABC	0.161***	0.015	DF	0.211***	0.022	E
	2018	0.009	0.025	A	0.123***	0.019	BD	0.201***	0.034	CEF
Deservingness (T2): Prev. earned by other	2016	0.133***	0.045	H	0.039**	0.017	GH	-0.027	0.021	GH
	2017	-0.022	0.024	GH	-0.026**	0.011	G	-0.029*	0.016	G
	2018	0.003	0.014	GH	-0.022*	0.014	G	-0.040	0.025	G
Reciprocity (T3): Prev. transferred by other	2016	0.042	0.059	J	0.194***	0.035	K	0.346***	0.056	L
	2017	0.204**	0.092	JKL	0.221***	0.047	JKL	0.237***	0.055	JKL
	2018	0.144*	0.074	JKL	0.102***	0.037	JK	0.059	0.051	JK
Deservingness (T3): Prev. earned by other	2016	-0.053*	0.027	MN	-0.035**	0.014	MN	-0.021	0.020	MN
	2017	-0.054*	0.031	MN	-0.070***	0.021	M	-0.083***	0.030	MN
	2018	0.008	0.019	MN	0.019	0.017	N	0.028	0.030	MN

Note: Conditional marginal effects (CME) with respect to other's previous behavior on transfers from strategy method in third round.

Margins sharing a letter in the group label are not significantly different at the 5% level using Bonferroni method.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ , individual t-tests for null hypothesis that margin is equal to zero.

## 2.5 Discussion

We found that a positive correlation between the frequency of offering help to others outside the lab and the probability that they send a transfer and the value of the transfer in the game. This is particularly significant for the middle cohort, i.e., at age 13. This positive correlation is significant and increases over the three consecutive years. For the oldest cohort (aged 16) we observe that the positive correlation is significant between the proportion of money transferred in the game (conditional on transferring) and self-reported offering help to others. However, we do not find any correlation between transferring in the game and receiving help from others in situations outside the lab (see Table 2.16 and Table 2.17 in the Appendix).

While Banerjee discusses the behavior of children of different ages in the same period, our panel data structure allows us to observe whether image concerns increase not only with age but over time for the same age group. We utilize survey questions that reveal the importance of social image for children and observe whether concerns for image is correlated with transfers in the game. Particularly in the second round, we use the observed donations decisions in the experiment when we make it explicit that the others in the group will know how much they give, which elicits social image. We have two measures of image in our survey; first, the number of friends that the participant has within the classroom and second, the importance of others' opinion regarding own self. The second question has three options "do not care," "care a little," and "care a lot." We find that having more friends in the classroom is not correlated with making decisions in the social image round (round 2). However, those children who said they cared a lot about others' opinion regarding own self were more likely to give in round 2, wherein their contribution would be revealed. This positive and significant correlation only holds for the oldest cohort (see estimations of CME in Table 2.18 and Table 2.19).

Additionally, we found that there is a significant and positive correlation between the expectation that others will help and the conditional transfers in the reciprocity treatment (T1-Transfers). Thus, if the students expect others might or will help them in terms of need, they are more likely to give in the conditional reciprocity round (see Table 2.20). The role of socialization is visible, since the positive correlation between expecting others to help when in need and contributing under conditional reciprocity is significant and increasing for the middle cohorts (13-year-olds). The magnitude increases from 13 percent in the first year to 15 percent in the second and falls to 12 percent in the third year. Children in the oldest cohort have the highest correlation of 19 percent, additionally, this magnitude does not change across the three years of the study. Thus, while the expectation of reciprocity increases contributions in consecutive years for the middle cohort, this positive correlation has a constant magnitude over time for the oldest cohort.

Lastly, we first observe whether parents' altruistic preferences measured as being active in volunteer work is correlated with children's probability of donating in the first round of the game, which elicits altruism. We find that parents' charitable giving and voluntary work is not correlated with a child's prosocial behavior in the game (see last columns in Table 2.16 and Table 2.17). This holds across all cohorts. Similarly, we do not find a correlation between how much the parents care about social image and the children's giving behavior in the social image treatment (last columns in Table 2.18 and Table 2.19). One of the reasons we do not find



evidence of inter-generational transmission could be that for school-age children in our sample social relations in the school become more important.

## 2.6 Conclusion

In this study, we implemented a solidarity game in a lab-in-the-field experiment set-up with children from the ages of seven to 18. Children play a solidarity game for four rounds under different informational conditions. The experimental design allows us to measure social preferences such as altruism, social image concerns, reciprocity, and conditional transfers in an informal risk-sharing group. We not only provide cross-section analysis but we also follow the children over three years to obtain the dynamics of other-regarding preferences.

We find that there is a critical age around which altruistic preferences develop in children. Children tend to become more altruistic between the age of 9 and 11. In particular, they become more likely to help to members of the network that are affected by a negative income shock. Experiences of solidarity outside home or altruistic preferences of parents seem to have little impact on the development of prosocial preferences in school-age children in our sample. Instead, children seem to be motivated to follow norms of cooperation in the school. For instance, transfers sent in the game is positively correlated with the expect behavior of others outside the lab. Additionally, we find a positive association between giving in the game and self-reported altruistic behavior in the family and community.

In response to information regarding the patterns of others' giving, we find that children do not respond to the deservingness of other children, they give the same amount independently on the value lost by the affected player. In a similar vein, the paper by [Harbaugh et al. \(2003a\)](#) also finds greater egalitarian and reciprocal behavior among the older cohorts. The authors postulate two reasons, namely first, social preferences develop over time as they require more nuanced and improved cognitive capacity; second, the authors suspect that the younger cohorts might have not understood the experiment correctly. This reasoning was also echoed by [Guzmán et al. \(2014\)](#). Contrary to the paper by [Guzmán et al. \(2014\)](#) that observe the impact of social image on prosocial behavior ([Andreoni and Miller, 1993](#); [Engelmann and Fischbacher, 2009](#)), we find that the very young children in our sample do not respond to social image concerns.

Finally, we contribute to the literature on the role of dynamics or the stability of prosocial preferences. Our findings are similar to [Carlsson et al. \(2014\)](#), and [Chuang and Schechter \(2015\)](#), who observe the stability among adults. We find, on average, that the responses to different information treatments in our study are stable across the three years, except for the youngest cohort.

Further research should be focused on analyzing preferences for a longer period. We observed children's behavior for three years, and this follow-up interval might not be enough to observed any significant changes in social preferences. In this study, although we can distinguish different motives for sharing, e.g., reciprocity or strategic behavior, social networks and interactions with others could also affect the development of social preferences, which is out of the scope of this study. In other words, we cannot quantify, for instance, how parenting style or how socialization in the classroom affects the development of prosocial behavior.

## 2.7 Appendix A

### I. Altruism

TABLE 2.5: Altruism by age - only first round, pooled treatments

	FE (1) Decision		RE (2) Decision		FE (3) Proportion income		RE (4) Proportion income	
	b	se	b	se	b	se	b	se
13 years-old	0.0591	(0.057)	0.1907***	(0.023)	-0.0067	(0.029)	0.0575***	(0.012)
16 years-old	0.0537	(0.076)	0.2033***	(0.026)	-0.0264	(0.038)	0.0737***	(0.013)
year=2017	0.0785***	(0.026)	0.0791***	(0.024)	0.0116	(0.013)	0.0106	(0.012)
year=2018	0.0719**	(0.035)	0.0710**	(0.031)	0.0094	(0.018)	0.0178	(0.016)
13 years-old × year=2017	-0.0767**	(0.030)	-0.0994***	(0.028)	0.0063	(0.015)	-0.0106	(0.014)
13 years-old × year=2018	-0.0674*	(0.040)	-0.0938***	(0.036)	0.0160	(0.020)	-0.0120	(0.018)
16 years-old × year=2017	-0.0918***	(0.031)	-0.1074***	(0.030)	0.0141	(0.016)	0.0056	(0.015)
16 years-old × year=2018	-0.0803*	(0.048)	-0.1050**	(0.042)	0.0324	(0.024)	0.0082	(0.021)
Earnings (1.000 COP)	0.0043	(0.003)	0.0064***	(0.002)	-0.0094***	(0.001)	-0.0068***	(0.001)
Female			0.0383***	(0.012)			-0.0002	(0.006)
Constant	0.9927***	(0.111)	0.5262***	(0.057)	0.2144***	(0.056)	0.0652**	(0.029)
Sociodemographic controls	Yes		Yes		Yes		Yes	
Family controls	Yes		Yes		Yes		Yes	
Children behavior	Yes		Yes		Yes		Yes	
Treatment dummies	No		Yes		No		Yes	
School dummies	No		Yes		No		Yes	
R squ.	0.018				0.036			
R squ. adj.	-0.847				-0.813			
sigma_u	0.231		0.109		0.118		0.055	
sigma_e	0.256		0.256		0.129		0.129	
rho	0.450		0.153		0.456		0.152	
Observations	3013		3013		3013		3013	
Groups	1390		1390		1390		1390	
Mean	0.906		0.906		0.163		0.163	

Note: Fixed and random effects models for (1)-(2) decision whether transfer or not and

(3)-(4) proportion of income transferred as dependent variables.

Sample includes children that participated at least in two years.

Hausman test: Prob>chi2 = 0.1400, so RE should be selected.

Breusch and Pagan Lagrangian multiplier test for random effects, Prob > chi2 = 0.0000, we cannot pool the data.

Standard errors in parentheses and robust to heteroskedasticity.

\* p<.1, \*\* p<.05, \*\*\* p<.01

TABLE 2.6: Altruism in the first round - Two waves participation

	FE (1) Decision		RE (2) Decision		FE (3) Proportion income		RE (4) Proportion income	
	b	se	b	se	b	se	b	se
13 years-old	0.0933	(0.085)	0.3044***	(0.031)	0.0094	(0.041)	0.0888***	(0.015)
16 years-old	0.0771	(0.115)	0.3205***	(0.034)	0.0185	(0.055)	0.1083***	(0.017)
year=2017	0.2797***	(0.036)	0.2424***	(0.031)	0.0519***	(0.017)	0.0475***	(0.015)
year=2018	0.1795**	(0.080)	0.1976***	(0.061)	0.0540	(0.038)	0.0678**	(0.030)
13 years-old × year=2017	-0.2724***	(0.041)	-0.2746***	(0.037)	-0.0301	(0.020)	-0.0526***	(0.018)
13 years-old × year=2018	-0.1449	(0.094)	-0.2717***	(0.070)	0.0143	(0.045)	-0.0540	(0.034)
16 years-old × year=2017	-0.2913***	(0.040)	-0.2743***	(0.037)	-0.0310	(0.019)	-0.0344*	(0.018)
16 years-old × year=2018	-0.2102**	(0.102)	-0.2714***	(0.078)	-0.0119	(0.049)	-0.0382	(0.038)
Earnings (1.000 COP)	0.0028	(0.005)	0.0068***	(0.003)	-0.0084***	(0.002)	-0.0065***	(0.001)
Female			0.0422***	(0.015)			0.0006	(0.008)
Constant	0.9533***	(0.167)	0.4732***	(0.078)	0.2047**	(0.080)	0.0438	(0.039)
Sociodemographic controls	Yes		Yes		Yes		Yes	
Family controls	Yes		Yes		Yes		Yes	
Children behavior	Yes		Yes		Yes		Yes	
Treatment dummies	No		Yes		No		Yes	
School dummies	No		Yes		No		Yes	
R squ.	0.110				0.035			
R squ. adj.	-0.966				-1.131			
sigma_u	0.261		0.108		0.120		0.059	
sigma_e	0.257		0.256		0.123		0.123	
rho	0.508		0.150		0.488		0.188	
Observations	1717		1717		1717		1717	
Groups	918		918		918		918	
Mean	0.901		0.901		0.166		0.166	

Note: Sample of children who participated in two waves. Fixed and random effects models for (1)-(2) decision whether transfer or not and (3)-(4) proportion of income transferred as dependent variables.

Standard errors in parentheses.

\* p<.1, \*\* p<.05, \*\*\* p<.01

TABLE 2.7: Altruism in the first round - Balanced panel three waves

	FE (1) Decision		RE (2) Decision		FE (3) Proportion income		RE (4) Proportion income	
	b	se	b	se	b	se	b	se
13 years-old	-0.0750	(0.075)	0.0094	(0.036)	-0.0497	(0.041)	0.0081	(0.019)
16 years-old	-0.0544	(0.098)	0.0268	(0.044)	-0.0881	(0.054)	0.0147	(0.024)
year=2017	-0.1936***	(0.038)	-0.1849***	(0.037)	-0.0482**	(0.021)	-0.0485**	(0.020)
year=2018	-0.0681*	(0.040)	-0.0957**	(0.038)	-0.0251	(0.022)	-0.0291	(0.021)
13 years-old × year=2017	0.1985***	(0.043)	0.1786***	(0.042)	0.0668***	(0.024)	0.0583**	(0.023)
13 years-old × year=2018	0.0705	(0.045)	0.0875**	(0.044)	0.0443*	(0.025)	0.0386	(0.024)
16 years-old × year=2017	0.2200***	(0.054)	0.1890***	(0.053)	0.0806***	(0.030)	0.0752***	(0.029)
16 years-old × year=2018	0.0838	(0.056)	0.0823	(0.054)	0.0676**	(0.031)	0.0637**	(0.029)
Earnings (1.000 COP)	0.0059	(0.004)	0.0059**	(0.003)	-0.0101***	(0.002)	-0.0076***	(0.001)
Female			0.0308*	(0.018)			-0.0005	(0.009)
Constant	1.0620***	(0.141)	0.5827***	(0.083)	0.2081***	(0.078)	0.0968**	(0.044)
Sociodemographic controls	Yes		Yes		Yes		Yes	
Family controls	Yes		Yes		Yes		Yes	
Children behavior	Yes		Yes		Yes		Yes	
Treatment dummies	No		Yes		No		Yes	
School dummies	No		Yes		No		Yes	
R squ.	0.043				0.067			
R squ. adj.	-0.545				-0.507			
sigma_u	0.206		0.112		0.112		0.056	
sigma_e	0.242		0.242		0.134		0.134	
rho	0.420		0.176		0.412		0.147	
Observations	1296		1296		1296		1296	
Groups	472		472		472		472	
Mean	0.913		0.913		0.160		0.160	

Note: Balanced panel. Sample includes only children who participated in all three waves.

Fixed and random effects models for (1)-(2) decision whether transfer or not and (3)-(4) proportion of income transferred as dependent variables.

Standard errors in parentheses.

\* p<.1, \*\* p<.05, \*\*\* p<.01

## II. Additional Tables

TABLE 2.8: Orthogonality table baseline - 2016

	(1) T0-Control	(2) T1-Transfer	(3) T2-Earnings	(4) T3- Earn./Transfer	(5) p-value orthogonality test
Age	12.24 (0.18)	12.92 (0.14)	13.47 (0.11)	12.95 (0.11)	0.00
Female	0.40 (0.03)	0.44 (0.03)	0.41 (0.02)	0.45 (0.02)	0.35
Work in the last month	0.25 (0.03)	0.25 (0.02)	0.27 (0.02)	0.24 (0.02)	0.72
Number of attended schools	1.90 (0.08)	1.78 (0.07)	2.11 (0.07)	2.19 (0.18)	0.14
Years with the same group	3.67 (0.21)	3.76 (0.15)	3.53 (0.14)	3.59 (0.12)	0.73
Total friends in general	25.48 (2.03)	22.40 (1.73)	25.62 (1.98)	25.76 (1.64)	0.52
Total siblings	2.01 (0.11)	2.43 (0.11)	2.07 (0.10)	2.18 (0.09)	0.03
Total household members	5.66 (0.37)	5.20 (0.13)	4.86 (0.12)	6.28 (1.01)	0.48
Family with both parents	0.62 (0.03)	0.62 (0.02)	0.58 (0.02)	0.57 (0.02)	0.31
Single parent family	0.37 (0.03)	0.35 (0.02)	0.39 (0.02)	0.39 (0.02)	0.56
Diff. econ. situation last month	0.39 (0.03)	0.37 (0.03)	0.37 (0.03)	0.40 (0.02)	0.83
Father has a job	0.98 (0.01)	1.00 (0.00)	0.94 (0.01)	0.97 (0.01)	0.00
Mother has a job	0.87 (0.02)	0.79 (0.02)	0.82 (0.02)	0.81 (0.02)	0.12
<i>N</i>	284	392	400	590	
Proportion	0.17	0.24	0.24	0.35	

Standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 2.9: Game outcomes in each round across treatments - All years

	(1) T0-Control	(2) T1-Transfer	(3) T2-Earnings	(4) T3- Earn./Transfer	(5) Overall	(6) p-value from joint orthogonality test of treatment arms
Pos. transfer in round 1	0.871 (0.013)	0.902 (0.009)	0.927 (0.008)	0.904 (0.008)	0.904 (0.005)	0.003
Pos. transfer in round 2	0.868 (0.013)	0.917 (0.008)	0.922 (0.008)	0.897 (0.008)	0.904 (0.005)	0.001
Pos. transfer in round 3	0.855 (0.014)	0.913 (0.008)	0.915 (0.009)	0.889 (0.008)	0.896 (0.005)	0.000
Pos. transfer in round 4	0.820 (0.015)	0.876 (0.010)	0.882 (0.010)	0.879 (0.008)	0.870 (0.005)	0.001
Prop. transfer in round 1	0.154 (0.006)	0.173 (0.004)	0.168 (0.005)	0.161 (0.004)	0.165 (0.002)	0.040
Prop. transfer in round 2	0.152 (0.005)	0.176 (0.004)	0.169 (0.004)	0.163 (0.004)	0.166 (0.002)	0.004
Prop. transfer in round 3	0.150 (0.005)	0.181 (0.004)	0.173 (0.004)	0.164 (0.004)	0.168 (0.002)	0.000
Diff. positive transfer R2-R1	-0.003 (0.014)	0.015 (0.009)	-0.005 (0.008)	-0.007 (0.008)	0.000 (0.005)	0.252
Diff. prop. transferred R2- R1	-0.002 (0.005)	0.003 (0.003)	0.002 (0.004)	0.002 (0.003)	0.001 (0.002)	0.844
Diff. positive transfer R3-R1	-0.015 (0.013)	0.011 (0.009)	-0.012 (0.009)	-0.016 (0.008)	-0.008 (0.005)	0.117
Diff. prop. transferred R3- R1	-0.005 (0.005)	0.007 (0.004)	0.006 (0.004)	0.002 (0.003)	0.003 (0.002)	0.213
<i>N</i>	2600	4444	4040	6004	17088	

Note: Standard errors in parentheses. Sample includes all children who participated, even if they participated one year.

TABLE 2.10: Treatment comparison - Diff-in-Diff coefficients – all years, RE

	Positive (1)		Proportion (2)		Positive (3)		Proportion (4)	
	b	se	b	se	b	se	b	se
year=2017	-0.015	(0.032)	-0.010	(0.012)	-0.032	(0.030)	-0.011	(0.012)
year=2018	-0.007	(0.034)	0.006	(0.013)	0.020	(0.041)	0.003	(0.014)
T1-Transfer	0.050	(0.031)	0.013	(0.011)	0.039	(0.031)	0.014	(0.012)
year=2017 $\times$ T1-Transfer	-0.051	(0.040)	-0.004	(0.015)	-0.012	(0.038)	0.011	(0.016)
year=2018 $\times$ T1-Transfer	-0.049	(0.041)	-0.047***	(0.018)	-0.063	(0.048)	-0.026	(0.018)
Earnings (1.000 COP)	0.005	(0.004)	0.004***	(0.001)	0.006*	(0.004)	0.002*	(0.001)
Constant	-0.175	(0.150)	-0.168***	(0.043)	-0.211	(0.142)	-0.114***	(0.044)
Sociodemographic controls	Yes		Yes		Yes		Yes	
Family controls	Yes		Yes		Yes		Yes	
Children behavior	Yes		Yes		Yes		Yes	
School dummies	Yes		Yes		Yes		Yes	
Mean	-0.002		-0.002		-0.004		0.001	
Observations	1268		1268		1267		1267	
Groups	805		805		804		804	
sigma_u	0.129		0.000		0.099		0.000	
sigma_e	0.282		0.122		0.292		0.132	
rho	0.173		0.000		0.103		0.000	

Note: RE regressions. (1)-(2) R2 vs R1. (3)-(4) R3 vs R1.

Sample includes children who participated at least in two waves.

Standard errors in parentheses and robust to heteroskedasticity.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

TABLE 2.11: Image concerns - Diff-in-Diff regression

	Positive		Proportion	
	(1)		(2)	
	b	se	b	se
13 years-old	0.052	(0.075)	0.026	(0.023)
16 years-old	0.076	(0.074)	0.032	(0.025)
year=2017	0.035	(0.080)	0.007	(0.031)
year=2018	0.202	(0.152)	0.076*	(0.041)
13 years-old $\times$ year=2017	-0.083	(0.087)	-0.021	(0.033)
13 years-old $\times$ year=2018	-0.264*	(0.158)	-0.087**	(0.041)
16 years-old $\times$ year=2017	-0.056	(0.085)	-0.025	(0.033)
16 years-old $\times$ year=2018	-0.220	(0.155)	-0.072	(0.045)
T1-Transfer	0.177*	(0.091)	0.025	(0.027)
13 years-old $\times$ T1-Transfer	-0.165*	(0.097)	-0.024	(0.029)
16 years-old $\times$ T1-Transfer	-0.198**	(0.095)	-0.014	(0.030)
year=2017 $\times$ T1-Transfer	-0.288**	(0.117)	-0.043	(0.039)
year=2018 $\times$ T1-Transfer	-0.386**	(0.171)	-0.101**	(0.047)
13 years-old $\times$ year=2017 $\times$ T1-Transfer	0.323***	(0.125)	0.061	(0.043)
13 years-old $\times$ year=2018 $\times$ T1-Transfer	0.441**	(0.179)	0.080	(0.049)
16 years-old $\times$ year=2017 $\times$ T1-Transfer	0.305**	(0.121)	0.040	(0.042)
16 years-old $\times$ year=2018 $\times$ T1-Transfer	0.363**	(0.178)	0.035	(0.060)
Earnings (1.000 COP)	0.004	(0.004)	0.002	(0.002)
Constant	-0.247	(0.176)	-0.183***	(0.047)
Sociodemographic controls	Yes		Yes	
Family controls	Yes		Yes	
Children behavior	Yes		Yes	
School dummies	Yes		Yes	
Mean	-0.002		-0.002	
Observations	1268		1268	
Groups	805		805	
sigma_u	0.135		0.000	
sigma_e	0.276		0.122	
rho	0.192		0.000	

Note: RE regressions. (1)-(2) R2 vs R1. (3)-(4) R3 vs R1.

Sample includes children who participated at least in two waves.

Standard errors in parentheses and robust to heteroskedasticity.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$



TABLE 2.12: Strategic transfers - Diff-in-Diff regression

	Positive		Proportion	
	(1)		(2)	
	b	se	b	se
13 years-old	0.094	(0.070)	0.050**	(0.025)
16 years-old	0.061	(0.069)	0.050*	(0.026)
year=2017	-0.004	(0.070)	-0.008	(0.031)
year=2018	0.082	(0.127)	0.023	(0.039)
13 years-old $\times$ year=2017	-0.050	(0.081)	0.010	(0.033)
13 years-old $\times$ year=2018	-0.174	(0.150)	-0.024	(0.040)
16 years-old $\times$ year=2017	-0.015	(0.075)	0.002	(0.034)
16 years-old $\times$ year=2018	0.029	(0.146)	-0.029	(0.044)
T1-Transfer	0.122	(0.088)	0.020	(0.029)
13 years-old $\times$ T1-Transfer	-0.130	(0.096)	-0.015	(0.032)
16 years-old $\times$ T1-Transfer	-0.110	(0.093)	-0.013	(0.034)
year=2017 $\times$ T1-Transfer	-0.097	(0.105)	-0.001	(0.041)
year=2018 $\times$ T1-Transfer	-0.199	(0.154)	-0.025	(0.046)
13 years-old $\times$ year=2017 $\times$ T1-Transfer	0.126	(0.117)	0.008	(0.045)
13 years-old $\times$ year=2018 $\times$ T1-Transfer	0.262	(0.180)	-0.006	(0.050)
16 years-old $\times$ year=2017 $\times$ T1-Transfer	0.103	(0.111)	0.019	(0.046)
16 years-old $\times$ year=2018 $\times$ T1-Transfer	0.082	(0.170)	0.028	(0.054)
Earnings (1.000 COP)	0.004	(0.004)	-0.001	(0.001)
Constant	-0.226	(0.162)	-0.090**	(0.045)
Sociodemographic controls	Yes		Yes	
Family controls	Yes		Yes	
Children behavior	Yes		Yes	
School dummies	Yes		Yes	
Mean	-0.004		0.001	
Observations	1267		1267	
Groups	804		804	
sigma_u	0.100		0.000	
sigma_e	0.291		0.133	
rho	0.106		0.000	

Note: RE regressions. (1)-(2) R2 vs R1. (3)-(4) R3 vs R1.

Sample includes children who participated at least in two waves.

Standard errors in parentheses and robust to heteroskedasticity.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

TABLE 2.13: Reciprocity Analysis in T1 (Transfer) - Transfers in R3.

	(1) POOLS b	se	(2) RE/panel b	se	(3) FE/panel b	se
Prev. other's transfer (1000COP)	0.145***	(0.016)	0.019	(0.021)	0.019	(0.021)
13 years-old	0.717***	(0.246)	-0.364	(0.338)		
16 years-old	1.225***	(0.232)	0.140	(0.377)		
year=2017			-0.657**	(0.296)	-0.518*	(0.309)
year=2018			-0.148	(0.455)	-0.942	(0.632)
13 years-old $\times$ Prev. other's transfer (1000COP)			0.138***	(0.026)	0.138***	(0.026)
16 years-old $\times$ Prev. other's transfer (1000COP)			0.179***	(0.027)	0.179***	(0.027)
year=2017 $\times$ Prev. other's transfer (1000COP)			0.061**	(0.029)	0.061**	(0.029)
year=2018 $\times$ Prev. other's transfer (1000COP)			0.013	(0.036)	0.013	(0.036)
13 years-old $\times$ year=2017			0.667*	(0.358)	0.741**	(0.369)
13 years-old $\times$ year=2018			0.555	(0.507)	1.612**	(0.678)
16 years-old $\times$ year=2017			0.215	(0.371)	0.014	(0.382)
16 years-old $\times$ year=2018			0.312	(0.552)	1.216*	(0.713)
13 years-old $\times$ year=2017 $\times$ Prev. other's transfer (1000COP)			-0.040	(0.036)	-0.040	(0.035)
13 years-old $\times$ year=2018 $\times$ Prev. other's transfer (1000COP)			-0.053	(0.042)	-0.053	(0.042)
16 years-old $\times$ year=2017 $\times$ Prev. other's transfer (1000COP)			-0.061	(0.037)	-0.061*	(0.037)
16 years-old $\times$ year=2018 $\times$ Prev. other's transfer (1000COP)			-0.031	(0.047)	-0.031	(0.047)
Constant	-3.238***	(0.557)			-0.953	(0.848)
Sociodemographic controls	Yes		Yes		Yes	
Family controls	Yes		Yes		Yes	
Children behavior	Yes		Yes		Yes	
School FE	No		Yes		No	
R squ.	0.185				0.167	
R squ. adj.	0.182				0.021	
Mean	2.663		2.663		2.663	
Observations	4900		4900		4900	
Groups			706		706	
sigma_u			1.846		2.157	
sigma_e			1.856		1.859	
rho			0.497		0.574	

Note: Conditional transfer from strategy method in T1 (Transfer) treatment.

(1) Random effects unbalanced panel. (2) Fixed effects unbalanced panel.

Standard errors in parentheses and robust to heteroskedasticity.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

TABLE 2.14: Deservingness Analysis in T2 (Earnings) - Transfers in R3.

	(1) POOLS		(2) RE/panel		(3) FE/panel	
	b	se	b	se	b	se
Prev. other's earnings (1000COP)	-0.007	(0.010)	0.231***	(0.028)	0.231***	(0.028)
13 years-old	-0.091	(0.314)	0.414	(0.390)		
16 years-old	0.137	(0.334)	0.580	(0.412)		
year=2017			0.465	(0.446)	0.681	(0.488)
year=2018			-0.098	(0.432)	-0.629	(0.543)
13 years-old × Prev. other's earnings (1000COP)			-0.223***	(0.029)	-0.223***	(0.029)
16 years-old × Prev. other's earnings (1000COP)			-0.238***	(0.030)	-0.238***	(0.030)
year=2017 × Prev. other's earnings (1000COP)			-0.235***	(0.040)	-0.235***	(0.040)
year=2018 × Prev. other's earnings (1000COP)			-0.238***	(0.035)	-0.238***	(0.035)
13 years-old × year=2017			-0.168	(0.467)	-0.355	(0.510)
13 years-old × year=2018			0.459	(0.462)	1.081*	(0.564)
16 years-old × year=2017			-0.194	(0.489)	-0.309	(0.532)
16 years-old × year=2018			0.961*	(0.495)	1.686***	(0.593)
13 years-old × year=2017 × Prev. other's earnings (1000COP)			0.196***	(0.042)	0.196***	(0.042)
13 years-old × year=2018 × Prev. other's earnings (1000COP)			0.215***	(0.038)	0.215***	(0.038)
16 years-old × year=2017 × Prev. other's earnings (1000COP)			0.218***	(0.044)	0.218***	(0.044)
16 years-old × year=2018 × Prev. other's earnings (1000COP)			0.201***	(0.042)	0.201***	(0.042)
Constant	-0.958	(0.807)	-0.123	(0.639)	0.285	(1.228)
Sociodemographic controls	Yes		Yes		Yes	
Family controls	Yes		Yes		Yes	
Children behavior	Yes		Yes		Yes	
School FE	No		Yes		No	
R squ.	0.051				0.048	
R squ. adj.	0.048				-0.136	
Mean	1.954		1.954		1.954	
Observations	4455		4455		4455	
Groups			695		695	
sigma_u			1.608		1.799	
sigma_e			1.429		1.429	
rho			0.559		0.613	

Note: Conditional transfer from strategy method in T2 (Earnings) treatment.

(1) Random effects unbalanced panel. (2) Fixed effects unbalanced panel.

Standard errors in parentheses and robust to heteroskedasticity.

\* p&lt;.1, \*\* p&lt;.05, \*\*\* p&lt;.01

TABLE 2.15: Analysis in T3 (Earnings/Transfer) - Transfers in R3.

	(1) POOLS		(2) RE/panel		(3) FE/panel	
	b	se	b	se	b	se
Prev. other's transfer (1000COP)	0.208***	(0.032)	0.005	(0.066)	0.022	(0.071)
Prev. other's earnings (1000COP)	-0.021*	(0.011)	-0.039	(0.033)	-0.031	(0.036)
13 years-old	0.240***	(0.076)	-0.187	(0.304)		
16 years-old	0.419***	(0.096)	-0.135	(0.348)		
year=2017			-0.560	(0.368)	-0.424	(0.400)
year=2018			-0.699*	(0.369)	-0.722*	(0.428)
13 years-old $\times$ Prev. other's transfer (1000COP)			0.207***	(0.077)	0.167**	(0.084)
16 years-old $\times$ Prev. other's transfer (1000COP)			0.296***	(0.079)	0.253***	(0.086)
year=2017 $\times$ Prev. other's transfer (1000COP)			-0.059	(0.118)	-0.042	(0.125)
year=2018 $\times$ Prev. other's transfer (1000COP)			0.076	(0.107)	-0.004	(0.127)
13 years-old $\times$ year=2017			1.220***	(0.445)	1.012**	(0.480)
13 years-old $\times$ year=2018			0.378	(0.457)	0.463	(0.521)
16 years-old $\times$ year=2017			0.584	(0.574)	-0.296	(0.627)
16 years-old $\times$ year=2018			0.169	(0.705)	0.063	(0.782)
13 years-old $\times$ year=2017 $\times$ Prev. other's transfer (1000COP)			0.125	(0.128)	0.106	(0.137)
13 years-old $\times$ year=2018 $\times$ Prev. other's transfer (1000COP)			-0.185	(0.121)	-0.095	(0.141)
16 years-old $\times$ year=2017 $\times$ Prev. other's transfer (1000COP)			-0.059	(0.130)	-0.072	(0.139)
16 years-old $\times$ year=2018 $\times$ Prev. other's transfer (1000COP)			-0.365***	(0.131)	-0.272*	(0.151)
13 years-old $\times$ Prev. other's earnings (1000COP)			0.023	(0.037)	0.012	(0.040)
16 years-old $\times$ Prev. other's earnings (1000COP)			0.012	(0.038)	-0.002	(0.042)
year=2017 $\times$ Prev. other's earnings (1000COP)			0.053	(0.044)	0.041	(0.047)
year=2018 $\times$ Prev. other's earnings (1000COP)			0.051	(0.047)	0.048	(0.052)
13 years-old $\times$ year=2017 $\times$ Prev. other's earnings (1000COP)			-0.117**	(0.050)	-0.102*	(0.054)
13 years-old $\times$ year=2018 $\times$ Prev. other's earnings (1000COP)			-0.020	(0.053)	-0.024	(0.059)
16 years-old $\times$ year=2017 $\times$ Prev. other's earnings (1000COP)			-0.028	(0.056)	0.041	(0.061)
16 years-old $\times$ year=2018 $\times$ Prev. other's earnings (1000COP)			0.009	(0.068)	-0.007	(0.075)
Constant	-1.171***	(0.359)	-0.854**	(0.407)	-0.683	(0.686)
Sociodemographic controls	Yes		Yes		Yes	
Family controls	Yes		Yes		Yes	
Children behavior	Yes		Yes		Yes	
School FE	No		Yes		No	
R squ.	0.179				0.114	
R squ. adj.	0.173				-0.425	
Mean	1.579		1.579		1.579	
Observations	2620		2620		2620	
Groups			954		954	
sigma_u			0.954		1.236	
sigma_e			0.992		0.992	
rho			0.480		0.608	

Note: Conditional transfer from strategy method in T3 (Earnings/Transfer) treatment.

(1) Random effects unbalanced panel. (2) Fixed effects unbalanced panel.

Standard errors in parentheses and robust to heteroskedasticity.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

### III. Mechanisms

TABLE 2.16: First round decisions of transferring

	(1) Index offer help b/se	(2) Index received help b/se	(3) Friends in the classroom b/se	(4) Mother's voluntary work b/se
9-years-old				
× year=2016	-0.023 (0.01)	-0.069 (0.05)	-0.030 (0.02)	0.007 (0.03)
× year=2017	0.046*** (0.01)	-0.030 (0.04)	0.003 (0.02)	0.022 (0.03)
× year=2018	0.050* (0.02)	0.118 (0.07)	0.001 (0.03)	0.053 (0.04)
13-years-old				
× year=2016	0.016 (0.01)	-0.039 (0.03)	-0.011 (0.01)	0.008 (0.02)
× year=2017	0.019* (0.01)	0.020 (0.03)	0.012 (0.01)	0.004 (0.02)
× year=2018	0.027* (0.01)	-0.060 (0.03)	0.033* (0.01)	0.004 (0.02)
16-years-old				
× year=2016	0.015 (0.01)	-0.043 (0.03)	0.008 (0.02)	0.008 (0.03)
× year=2017	0.025* (0.01)	-0.016 (0.03)	0.022 (0.02)	-0.015 (0.03)
× year=2018	0.016 (0.02)	-0.001 (0.05)	0.064* (0.03)	-0.045 (0.04)
Observations	2504	1027	3013	615

TABLE 2.17: First round decisions of proportion transferred

	(1) Index offer help b/se	(2) Index received help b/se	(3) Friends in the classroom b/se	(4) Mother's voluntary work b/se
9-years-old				
× year=2016	0.002 (0.01)	-0.057* (0.02)	-0.005 (0.01)	-0.001 (0.01)
× year=2017	0.020** (0.01)	0.007 (0.02)	-0.004 (0.01)	0.017 (0.01)
× year=2018	-0.004 (0.01)	0.029 (0.03)	0.002 (0.01)	0.048** (0.02)
13-years-old				
× year=2016	0.014** (0.00)	-0.016 (0.01)	-0.003 (0.01)	0.002 (0.01)
× year=2017	0.019*** (0.00)	0.006 (0.01)	0.001 (0.00)	0.003 (0.01)
× year=2018	0.020** (0.01)	0.029 (0.02)	0.011 (0.01)	0.019 (0.01)
16-years-old				
× year=2016	0.019*** (0.01)	-0.021 (0.02)	-0.002 (0.01)	0.005 (0.02)
× year=2017	0.014** (0.01)	0.022 (0.01)	0.006 (0.01)	-0.010 (0.02)
× year=2018	0.010 (0.01)	0.021 (0.02)	0.020 (0.01)	-0.009 (0.02)
Observations	2504	1027	3013	615

TABLE 2.18: Change of the decisions of transferring, social image concerns, Round 2 vs Round 1

	(1) Friends in the classroom b/se	(2) Importance of others' opinion about me b/se	(3) Mother cares what others think b/se
9-years-old			
× year=2016	-0.007 (0.05)	0.057 (0.05)	0.050 (0.07)
× year=2017	-0.080 (0.05)	0.023 (0.03)	0.041 (0.05)
× year=2018	0.000 (0.02)	0.002 (0.04)	0.002 (0.01)
13-years-old			
× year=2016	-0.022 (0.02)	0.009 (0.02)	-0.012 (0.02)
× year=2017	-0.002 (0.01)	-0.007 (0.02)	-0.011 (0.02)
× year=2018	0.008 (0.02)	-0.042 (0.03)	-0.023 (0.03)
16-years-old			
× year=2016	0.022 (0.02)	0.039** (0.01)	0.004 (0.01)
× year=2017	0.005 (0.01)	0.035* (0.02)	-0.002 (0.01)
× year=2018	-0.055 (0.03)	-0.054 (0.05)	0.020* (0.01)
Observations	2504	2504	1040

TABLE 2.19: Change on the proportion transferred. Social image concerns, Round 2 vs Round 1

	(1) Friends in the classroom b/se	(2) Importance of others' opinion about me b/se	(3) Mother cares what others think b/se
9-years-old			
× year=2016	0.009 (0.01)	0.012 (0.01)	0.009 (0.01)
× year=2017	-0.008 (0.01)	-0.023 (0.01)	0.015 (0.02)
× year=2018	-0.006 (0.01)	-0.008 (0.01)	0.000 (0.01)
13-years-old			
× year=2016	0.001 (0.01)	-0.005 (0.01)	0.000 (0.01)
× year=2017	0.003 (0.00)	-0.010 (0.01)	-0.008 (0.01)
× year=2018	-0.004 (0.01)	0.014 (0.02)	0.032* (0.02)
16-years-old			
× year=2016	-0.004 (0.01)	-0.008 (0.01)	0.005 (0.01)
× year=2017	0.001 (0.01)	0.005 (0.01)	0.014* (0.01)
× year=2018	-0.018 (0.02)	-0.028 (0.02)	-0.009 (0.01)
Observations	2504	2504	1040



TABLE 2.20: Reciprocity and expected help (T1)

	Nobody will help Prev. other's transfer (1000COP) b/se	Others might help Prev. other's transfer (1000COP) b/se	Others will help Prev. other's transfer (1000COP) b/se
9-years-old			
× years=2016	0.137* (0.06)	0.042 (0.03)	0.014 (0.02)
× years=2017	0.004 (0.06)	0.079*** (0.02)	0.101*** (0.02)
× years=2018	-0.038 (0.05)	0.009 (0.03)	0.028 (0.03)
13-years-old			
× years=2016	0.069* (0.03)	0.135*** (0.01)	0.152*** (0.01)
× years=2017	0.006 (0.03)	0.152*** (0.01)	0.184*** (0.01)
× years=2018	-0.048 (0.03)	0.119*** (0.02)	0.151*** (0.02)
16-years-old			
× years=2016	0.003 (0.04)	0.189*** (0.02)	0.258*** (0.02)
× years=2017	0.008 (0.04)	0.196*** (0.02)	0.248*** (0.02)
× years=2018	-0.057 (0.06)	0.185*** (0.02)	0.246*** (0.03)
Observations	210	2400	2290

TABLE 2.21: Reciprocity and Parents' lend money (T1)

	No Prev. other's transfer (1000COP) b/se	Yes Prev. other's transfer (1000COP) b/se
9-years-old		
× year=2016	-0.031 (0.04)	0.019 (0.02)
× year=2017	0.072 (0.04)	0.126*** (0.03)
× year=2018	-0.057 (0.04)	0.015 (0.03)
13-years-old		
× year=2016	0.037 (0.02)	0.121*** (0.01)
× year=2017	0.116*** (0.03)	0.197*** (0.02)
× year=2018	0.145*** (0.03)	0.157*** (0.02)
16-years-old		
× year=2016	0.105** (0.04)	0.202*** (0.02)
× year=2017	0.160*** (0.05)	0.255*** (0.03)
× year=2018	0.345*** (0.05)	0.272*** (0.03)
Observations	335	1700

TABLE 2.22: Reciprocity and Parents' gifts (T1)

	No Prev. other's transfer (1000COP) b/se	Yes Prev. other's transfer (1000COP) b/se
9-years-old		
× year=2016	0.008 (0.07)	0.012 (0.02)
× year=2017	-0.073 (0.12)	0.124*** (0.03)
× year=2018	-0.060 (0.07)	0.011 (0.03)
13-years-old		
× year=2016	0.091** (0.04)	0.113*** (0.01)
× year=2017	0.105* (0.05)	0.193*** (0.02)
× year=2018	0.270*** (0.04)	0.139*** (0.02)
16-years-old		
× year=2016	0.151*** (0.04)	0.198*** (0.02)
× year=2017	0.234*** (0.06)	0.251*** (0.03)
× year=2018	0.508*** (0.07)	0.247*** (0.03)
Observations	250	1775

## 2.8 Appendix B

### I. Experimental instructions

#### Instructions

Welcome!

Before starting please open your tablets and press the update button that is in the upper-right corner of your screens, where the icon of the house is located.

*- Wait for the coordinator's instructions to continue -*

This activity has been organized by a group of students from the University of Goettingen, Germany, and will be carried out in different courses and in different schools. To make sure that everyone receives the same information, we will read the explanation out loud.

The goal of this activity is to understand the economic decision-making of middle and high-school students. During this activity we ask that you remain silent and do not talk to any of your classmates until the activity is finished. If you have any questions please raise your hand and one of our assistants will come to you to help. Regardless of the results of the activity, each of you will receive 1,500 pesos for participating.

What are we doing today?

We will be doing an activity where you can earn money that will be paid at the school store in the form of food and drinks. The amount of money you get will depend on your decisions, the decisions of your colleagues, and luck.

Please pay close attention to the instructions that we will give you during the game. We will then ask some simple questions and you will be asked to fill out a survey. The game takes roughly one and a half hours.

Before we start the activity, you will be organized into groups of three people. The groups are going to be randomly picked by the computer. You will be identified not by name, but by color: Yellow, Blue or Red. Each group will be made up of one Yellow participant, one Blue, and a Red. The group will be kept the same for the entire activity. During the game, you will not know what color you have been given, nor will you know the color of the other members of your group or who they are.

What is the game about?

During the game you have to do two things. Let's show an example of the first task.

*- Enter the screen with the bars -*

On the screen you will see 30 bars, divided into two columns, 15 on the left and 15 on the right. Each of these bars has a cursor that is located on the left at zero. Your task is to slide the cursor of each bar and place it exactly at 50. In some tablets at the bottom there are two hidden bars, slide the screen up to view them. You can make the number of bars you want. Since this is just an example, you have 1 minute to try it out. Go ahead and give it a try!

*- When everyone finishes with the example, continue with the reading -*

Remember that this was just an example. For each bar that you can position exactly at the 50 mark, you will receive 500 pesos (show a 500 pesos coin). If the bar is not exactly on 50, you will not receive any payment. You will be given 2 minutes to perform this activity.

Let's look at this example

*- The examples of income are shown in the tablets -*

The income in this activity will be equal to the number of bars located on the 50 times 500 pesos. That is, if you correctly place 10 bars at 50, how much will you receive?  $500 \times 10 = 5000$  pesos

If you position 15 bars at exactly 50, how much will you receive?  $500 \times 15 = 7500$  pesos

One of our assistants will pay you your income from this round in play money. Are there any questions so far?

*- The trial round page is displayed -*

Now, we are going to do a test round so you can learn how to do the activity. This round will NOT affect your final payments.

At the end of the round you will know how many bars you positioned at 50 during the 2 minutes. When the results appear, please read them and then press the "next" button to continue. During the activity, it is very important that you DO NOT COMMENT out loud on the results to your colleagues, nor should you look at the results of others. These results are private. Let us begin!

*- At the end of the trial round, wait for the results to be shown and continue reading -*

Please read the information that appears on the screen and press "next" to continue.

*- Wait for the coordinator's indication to continue -*

Second part of the explanation:

In this game there is the possibility that you may lose all the money you have won. This is all just a question of luck. At the end of each round, the computer will select a color, and the person who is identified with this color will lose all the money they got for positioning the bars. In each round one player in your group will lose all their income.

Your second task is to decide how much, from the money you earned, you want to give away to the player who lost. You can give away any value, how ever much you want, you can also decide to give nothing.

You will find on your table a total of 8 envelopes, 4 with the word PASS (PASAR originally in Spanish) and 4 blank envelopes.

If you want to give some of your money to the player who lost all theirs then put it in the envelope marked with the word PASS (show envelope). The rest of the money is yours to keep and you can put it safely away in one of the other blank envelopes (show envelope).

Please check that the envelopes have your tablet identification number on them and the number of the round. The number of the tablet is found in the upper-left part of the screen. The

envelopes are marked with R1, R2, R3, and R4. If you have any inconsistency or the number on the envelope does not match the number on your tablet, please raise your hand and one of our assistants will help you.

Once you have finished this task, you will find a bar on the tablet screen that shows the amount of money you deposited in the PASS envelope. Please remember that the amount of money you put in the envelope and the amount you enter in the tablet must match.

Please do not write, scratch, fold, seal, or make any marks on the envelopes, we need them again in other courses. Do you have questions so far?

How much will you win in the game? If you are not selected to lose, what you receive in the round will be equal to your income minus the amount you put into the PASS envelope.

For example, if you received 5000 pesos and spent 1000 pesos, your earnings will be 4000 pesos; if you received 7500 pesos and spent 3000 pesos, your earnings will be 4500 pesos. Keep in mind that the money that you and the other person in the group place in the PASS envelope will be what the loser in your group receives.

What happens if you lose? In that case you will receive what the other two members of the group have placed in the PASS envelope.

For example: if one player passes 500 pesos and the other passes 2000 pesos, you will receive 2500 pesos. Another example, if one player passes 3000 pesos and the other 1000 pesos, you will receive 4000 pesos.

To make things even clearer, let's look at an example on the tablet.

*- The example of the game is shown on the tablets.*

I will read the example and if you have any questions please raise your hand.

Suppose someone managed to position 12 bars at the 50 mark. Then their income would be:  
 $12 \times 500 = 6000$  pesos

If the participant passed 3000 pesos to the person who lost, if he has good luck his profit will be:  $6000 - 3000 = 3000$  Pesos

How much do you get if you lose? It all depends on how much the other players in the group have given you. If they give 1000 pesos to the player who lost their money then that player will get 1000 pesos, if you are given 5000 pesos, you will receive 5000 pesos and so on. Do you have any questions so far?

Before we start we would like to ask you some questions to make sure we explained things clearly. Please read carefully and answer the questions. Do not use full stops, or commas when you write thousands, only numbers. When you finish answering the questions, press "next" to continue the activity. If you have any questions, please raise your hand and one of our assistants will help you.

*- Do not read the control questions -*

### **Control questions**

1. There are three players in a group: Yellow, Blue and Red. The computer selects the player Red, who loses all his income.
  - a. The yellow player completes 10 bars and receives 5000 pesos. If she deposits 2000 pesos in the PASS envelope, what is the yellow player's payment? (Answer, 3000)

b. The blue player completes 12 bars and receives 6000 pesos. The Blue player decides to place in 1000 pesos PASS envelope. How much does this player receive? (Answer, 5000)

c. The Red player completes 8 bars and receives 4000 pesos. He passes 1000 pesos in the envelope. How much does the Red player get? (Answer, 4000)

2. Another situation: The Yellow player receives 8000 pesos for the bars and deposits 3000 pesos in the PASS envelope,

a. How much does the Yellow player win if they have good luck and is not selected to lose their money? (Answer, 5000)

b. How much does the Yellow player receive if they have bad luck, loses what they won in the bars, if it is known that the Red player placed 3000 pesos in the PASS envelope, and the Blue player placed 1000 pesos in the envelope? (Answer, 4000)

*- Read the following sentence after 3 minutes -*

Remember that if you have doubts you can raise your hand and one of our assistants will help you.

*- Wait for everyone to answer the questions and instructions of the coordinator to continue -*

When will you know whether you have lost or not? The game consists of four rounds. At the end of the four rounds the computer will randomly select a round for payment. Each player will receive the winnings ONLY from the selected round.

Between the rounds you will not know if you lost or not. Only at the end will you find out the color given to you and whether you lost your income or not. In addition, if you lose, you will know the total value that the other two players in your group passed on to you.

At the end of the game, the screen will show the amount of money you will be getting from the game. However, we will check that the amount of money in the envelopes matches the sum recorded on the tablet. It is very important that these values are the same. Therefore, you may receive more, or less of the amount shown on the tablet.

In the next few days we will give the store the list of the amount each person has in credit. The store will only give the payment in the form of things to eat (cookies, potatoes, etc.), and it is not authorized to give the payment in cash. Also, without the authorization of your parents we cannot make the payments. Is this clear?

### **First round**

Let's start the game. The first task is to position the bars exactly at 50. For each bar that is exactly at 50 you will receive 500 pesos. You have two minutes to do this activity. If you finish before 2 minutes, please remain silent and wait until the 2 minutes are over. Let us begin!

*- After 2 minutes. Continue reading -*

Remember that the results are INDIVIDUAL. Now our assistants will go through each of your seats to give you the money for this round.

Please: Prepare the envelopes for ROUND 1, that is, the envelope marked with the word PASS and the other blank envelope (show envelopes). Remember that in the PASS envelope, you must put in the money you want to give to the person in your group who lost their money and you should put the rest of the money in the other envelope.

- *The assistants distribute the income. Wait for the coordinator's instructions to continue* -

A bar will now appear on the tablet, please record the amount you put into the PASS envelope by moving the cursor on the bar and pressing "next" to continue.

- *When everyone decides how much to pass, the assistants collect the envelopes. Wait for instructions from the coordinator to continue and read the paragraph in bold* -

While we collect the envelopes, please answer the following questions. For each correct answer you will receive 500 pesos, if this round is selected for payments. Do not use full stops or commas when you write thousands, only numbers. When you have finished answering the questions, please press "next" to continue the activity. Remember: If you have any questions, please raise your hand and one of our assistants will help you.

- *Read and clarify questions only in sessions with elementary students* -

1. How much do you think that, on average, each member of your group RECEIVED for the bar task in this round?

2. How much do you think that, on average, each member of your group PASSED on to the unlucky loser in this round?

- *Everyone must be on the page to start round 2, wait for the coordinator's instructions to continue* -

### **Second round**

*Instructions T0:* In this round the rules of the game will be the same as in the previous round. Let us begin!

*Instructions T1:* The rules of the game are now going to change a bit. The players in your group will know the amount that you PASS ON to the loser in this round. The rest of the rules will stay the same as before.

*Instructions T2:* The rules of the game are now going to change a bit. The players in your group will be told the amount you RECEIVE for the bar task of this round. The rest of the rules will stay the same as before.

*Instructions T3:* The rules of the game are now going to change a little: The players in your group are going to be told the value that you RECEIVE for the bar task and what you decided to PASS ON to the loser in this round. The rest of the rules will stay the same as before.

- *After 2 minutes. Continue reading* -

Remember that the results are INDIVIDUAL. Now our assistants will go to each of your seats, giving you the money for this round.

Please prepare the envelopes for ROUND 2, that is, the envelope marked with the word PASS and the other unmarked envelope (show envelopes). Remember that you should deposit the money you want to give to the person who lost all of theirs in the PASS envelope and in the other envelope you deposit the remaining money.



- *The assistants distribute the income. Wait for the coordinator's instructions to continue* -

A bar will now appear on the tablet, please record the sum you put into the PASS envelope by moving the cursor on the bar and pressing “next” to continue.

- *When everyone decides how much to pass, the assistants collect the envelopes. Wait for instructions from the coordinator to continue and read the paragraph in bold* -

While we collect the envelopes, please answer the following questions. For each correct answer you will receive 500 pesos, if this round is selected for payments. Do not use full stops or commas when you write thousands, only numbers. When you finish answering the questions, please press “next” to continue the activity. Remember: If you have any questions, please raise your hand and one of our assistants will help you.

- *Read and clarify questions only in sessions with primary school children* -

1. How much do you think that, on average, each member of your group RECEIVED for the bar task in this round?

2. How much do you think that, on average, each member of your group PASSED on to the unlucky loser in this round?

- *Everyone must be on the page to start round 3, wait for the coordinator's instructions to continue* -

### **Third Round**

*Instructions T0:* We are going to start the third round. In this round the rules of the game will be kept the same as in the previous round. Let us begin!

*Instructions T1:* The activity continues as before, except that at the end of the round, you can decide how much you want to pass on to the player who lost in this round, depending on what he or she PASSED ON to the loser in the previous round. Let's look at an example: (Go to the reading of the example below the table). For example: If the player who lost in this round PASSED from \$0 to \$3000 in the previous round, how much would you like to pass?

*Instructions T2:* The activity continues the same as before, except that at the end of the round, you can decide how much you want to pass on to the player who lost in this round, depending on what he or she RECEIVED from the bar task in the previous round. Let's look at an example: (Start reading the example below the table). For example: If the player who lost in this round RECEIVED between \$0 to \$3000 in the previous round, how much would you like to pass on to them?

*Instructions T1 and T2:* To indicate the value you want to pass, you will see at the end of the round one bar per row, which you can move to the corresponding value. Keep in mind that each row is independent and that all your decisions are going to be taken into account during the game. The amount you decide to pass on does not need to be equal to the values of the interval, you can pass ANY amount. Do you have any questions? (Read the explanation again if necessary) If you have doubts about the table, at the end of the round raise your hand and one of our assistants will help you. Let us begin!

*Instructions T3:* The activity continues as before, except that at the end of the round you can decide how much you want to pass on to EACH MEMBER OF YOUR GROUP, DEPENDING ON WHAT HE OR SHE HAS RECEIVED AND PASSED TO THE loser IN THE PREVIOUS ROUND, IF THEY ARE PICKED TO LOSE IN THIS ROUND. Is it clear? (Read again if necessary) Let us begin!

- After 2 minutes. Continue reading -

Remember that the results are INDIVIDUAL. Now our assistants will go to each of your seats, giving you the money for this round.

Please prepare the envelopes for ROUND 3, that is, the envelope marked with the word pass and the other unmarked envelope (show envelopes). Remember that in the PASS envelope, you should put in the money you want to give to the person in your who lost all theirs and in the other envelope you can put aside the rest of the money.

- The assistants distribute the income. Wait for the coordinator's instructions to continue -

A bar will now appear on the tablet, please record the value you deposited in the PASS envelope by moving the cursor on the bar and pressing "next" to continue.

- When everyone decides how much to pass, the assistants collect the envelopes. Wait for instructions from the coordinator to continue reading -

*Instructions T0:* While we collect the envelopes, please answer the following questions. For each correct answer you will receive 500 pesos, if this round is selected for payments. Do not use full stops or commas when you write thousands, only numbers. When you have finished answering the questions, please press "next" to continue the activity. Remember: If you have any questions, please raise your hand and one of our assistants will help you (same questions about expected behavior as in rounds 1 and 2).

*Instructions T1 and T2:* While we collect the envelopes, please complete the table that appears on the screen. Record the corresponding amount that you want to pass for each interval.

*Instructions T1:* For example: If the player who lost in this round PASSED from \$3500 to \$6500 in the previous round, indicate the value that you want to pass by moving the bar of the corresponding row.

*Instructions T2:* For example: If the player who lost in this round RECEIVED between \$3500 and \$6500 in the previous round, indicate the value you want to pass on by moving the bar of the corresponding row.

*Instructions T1 and T2:* Guys! You do not need to pass on the same amount as in the interval, you can pass ANY value.

*Instructions T1:* When you finish filling the table, you will see what the participants in your group passed to the loser in the previous round. Please read this information and press "next" to continue to the following round.

*Instructions T2:* When you finish filling in the table, you will see what the participants in your group received in the previous round for the bar task. Please read this information and press "next" to continue to the following round.

*Instructions T3:* While we collect the envelopes, please indicate on the tablet, how much you want to pass to each member of your group if they lose in this round, depending on what they have received for positioning the bars and the amount they passed on to the loser in the previous round. When you have recorded the amount, press “next” to continue.

#### **Fourth Round**

- *Everyone must be on the page to start round 4, wait for the coordinator’s instructions to continue* -

*Instructions T0:* We are going to start the final round. In this round the rules of the game will be kept the same as in the previous round.

*Instructions T1:* We are now going to start the final round, the conditions will stay the same as in the previous round: That is, you can decide how much you want to spend on the player who lost in this round, depending on what they PASSED to the loser in the previous round.

*Instructions T2:* We are now going to start the final round, the conditions will stay the same as in the previous round: That is, you can decide how much you want to pass on to the player who lost in this round, depending on what they RECEIVED in the bar task in the previous round.

*Instructions T1 and T2:* Remember that to indicate the amount you want to pass, at the end of the round you will see one bar per row, which you can move to the corresponding value. Each row is independent, it is not necessary that what you decide to pass equals the values of the interval. Remember that all your decisions will be taken into account during the game.

*Instructions T3:* We are now going to start the final round. The conditions will remain the same as in the previous round: That is, you can decide how much you want to pass on to the player who lost in this round depending on what he or she RECEIVED and PASSED on to the loser in the previous round.

Let us begin!

- *After 2 minutes. Continue reading* -

Remember that the results are INDIVIDUAL. Now our assistants will go to each of your posts giving out the money for this round.

Please: Prepare the envelopes corresponding to ROUND 4, that is, the envelope marked with the word pass and the other unmarked envelope (show envelopes). Remember that in the envelope PASS, you must deposit the money you want to give to the person in your group who lost and you should put the rest of the money in the other envelope.

- *The assistants distribute the income. Wait for the coordinator’s instructions to continue* -

A bar will now appear on the tablet, please record the amount you deposited in the PASS envelope by moving the cursor on the bar and pressing “next” to continue.

- *When everyone decides how much to pass, the assistants collect the envelopes. Wait for instructions from the coordinator to continue and read the paragraph in bold* -

*Instructions T0:* While we collect the envelopes, please answer the following questions. For each correct answer you will receive 500 pesos, if this round is selected for payment. Do not use full stops or commas when you write thousands, only numbers. When you finish answering the questions, please press “next” to continue the activity. Remember: If you have any questions, please raise your hand and one of our assistants will help you. (same questions about expected behavior as in rounds 1 and 2)

*Instructions T1 and T2:* While we collect the envelopes, please complete the table that can be seen on the screen. Record the corresponding amount that you want to pass in each interval.

*Instructions T1:* For example: If the player who lost in this round PASSED to the loser between \$3500 and \$6,500 in the previous round, show the value that you want to pass by moving the bar of the corresponding row.

*Instructions T2:* For example: If the player who lost in this round RECEIVED between \$3500 and \$6500 in the previous round, indicate the value they want to spend by moving the bar of the corresponding row.

*Instructions T1 and T2:* You do not need to pass the equal value of the interval, you can pass ANY amount that you choose.

*Instructions T3:* While we collect the envelopes, please indicate on the tablet, how much you want to pass to each member of your group if they were picked to lose in this round, depending on what they received for positioning the bars and the amount they passed to the loser in the previous round. When you have recorded the values, press “next” to continue.

- *Wait for instructions from the coordinator to continue reading* -

*Instructions T0:* When you answer the questions, the final results of the game will appear on the screen.

*Instructions T1 and T2:* When you finish filling in the table, you will see what the participants in their group passed to the loser in the previous round. Please read this information and press “next” to continue to the following game.

*Instructions T1, T2 and T3:* The final results of the game will now appear on the screen.

You will find out your assigned color and the round selected for payment.

If you were chosen to lose, you will receive the value that the other two members of the group passed on to you. If you did not lose, you will receive the value of your income for the bar task, minus the amount that you passed to the loser in that round.

Please read the information, press next, and continue to the final game.

- *Read instructions of the other game. When the other game ends, make the clarifications of the final survey and the questionnaire to parents* -

- *Wait for the coordinator’s instructions to continue with the questionnaire* -

Subsequently, you will answer the questionnaire that is shown on the tablet. Don’t worry, the questions are very simple.

You can start now.

Thank you to the teacher for letting us interrupt their normal schedules and to you (students), thank you very much for participating in this activity! We will now wait for the teacher's instructions.

- *End of instructions* -

## II. Exit questionnaire

### A. Your opinion about the game

1. How often do you use mobile phones and/or tablets to play? (Select an answer from the following options)

☐ Everyday ☐ Some days of the week ☐ A few days of the month ☐ Never

2. How well did you understand the rules of the game? (Select an answer from the following options)

☐ Very well ☐ More or less okay ☐ I did not understand

3. For me, finishing the tasks of the game was: (Select an answer from the following options)

☐ Very easy ☐ More or less ☐ Very hard

4. During the game I tried to ...

a. Get a high income for myself: (Select an answer from the following options)

☐ Too much ☐ A little ☐ Never

b. Get a high income for the group: (Select an answer from the following options)

☐ Too much ☐ A little ☐ Never

c. Help the other members of the group: (Select an answer from the following options)

☐ Too much ☐ A little ☐ Never

5. The people played badly because ... (Select an answer from the following options)

☐ They have fewer skills ☐ They are lazy ☐ They have bad luck ☐ None of the above

6. If the results are bad for the participants of the game, it is your responsibility to help them? (Select an answer from the following options)

☐ Yes ☐ No

7. Have you ever participated in a similar game? (Select an answer from the following options)

☐ No. This was the first time. ☐ Yes. I participated in the past.

8. You are? (Select an answer from the following options)

☐ Boy ☐ Girl

9. How old are you? [Box to type in (numbers)] years old

10. In which neighborhood do you live? (Box to type in)

11. How long have you been a student the school? (Include this year) [Box to type in (numbers)] years

12. How many have you been with the same classmates? [Box to type in (numbers)] years

13. How many schools have you attended? (Include this school; DO NOT include kindergarden) [Box to type in (numbers)] school(s)

13.1 How many years did you attend kindergarden? (Select from the drop-down list) (Next button)

14. During the last month,

a. Did you help other children from your school when they needed it? (Select an answer from the following options)

☐ Yes ☐ No

b. Did you help family members without receiving any payment? For instance, babysitting, helping sick people or helping with repairs at home. (Select an answer from the following options)

☐ Yes ☐ No

c. Did you help other families or people without receiving any payment? For instance, babysitting, helping sick people or helping with repairs at home. (Select an answer from the following options)

☐ Yes ☐ No

d. Did you help your community without receiving any payment? For instance, keeping the community clean. (Select an answer from the following options)

☐ Yes ☐ No

e. Did you participate in social and cultural activities? For instance, arranging parties, meeting, social activities (Select an answer from the following options)

☐ Yes ☐ No

15. How much money do you get from your parents weekly? Include the money to buy food or drinks at school, transportation, MATERIALS, ETC. [Box to type in (numbers)] pesos.

16. During the last month, have you been given money for a job or for completing a task? (Select an answer from the following options)

☐ No ☐ Yes (Next button)

B. You and your family.

17. How many siblings do you have in total? (Box to type in)

17.1 How many brothers do you have? (If you do not have brothers record zero) (Box to type in)

17.2 How many sisters do you have? (If you do not have brothers record zero) (Box to type in)

17.3 Among your siblings you are?

☐ I am the younger sibling ☐ I am the middle sibling ☐ I am the older sibling

20. In total, how many people live in your home (including yourself)? [Box to type in (numbers)] people

21. Do you live with your mother and father in a house? (Select an answer from the following options)

☐ Yes, with both ☐ Only with my mom. ☐ Only with my dad. ☐ I do not live with my parents

22.1 How old is your father? (Box to type in)

22.1.1 What is the highest educational level of your father? (Select from the drop-down list)

☐ Incomplete primary education ☐ Complete primary education ☐ Incomplete secondary education ☐ Complete secondary education ☐ Incomplete Tertiary education ☐ Technical level ☐ College education ☐ I do not know

22.2 How old is your mother? (Box to type in)

22.2.1 What is the highest educational level of your mother? (Select from the drop-down list)

☐ Incomplete primary education ☐ Complete primary education ☐ Incomplete secondary education ☐ Complete secondary education ☐ Incomplete Tertiary education ☐ Technical level ☐ College Education ☐ I do not know

23.1 Does your father work?

☐ Yes ☐ No ☐ I do not know

23.2 Does your mother work?

☐ Yes ☐ No ☐ I do not know

24. If your family were in a difficult economic situation, do you think that somebody would help you? (Select an answer from the following options)

☐ Yes, absolutely ☐ I am not sure ☐ Nobody would help us

25. During the last month, has your family had a difficult economic situation? (Select an answer from the following options)

☐ I do not know ☐ No ☐ Yes

27. During the last month, does your family help some relatives of yours or neighbors when they needed it?

☐ Yes, almost always ☐ Sometimes ☐ No, almost never

C. You and your friends

28. About your friends:

a. How many female friends do you have in total? [Box to type in (numbers)] friends

b. How many male friends do you have in total? [Box to type in (numbers)] friends

30. What would you say about your classmates? (Select an answer from the following options)

☐ Every student in this course is a good friends of mine. ☐ Many of the students in this course are good friends of mine. ☐ Few students in this course are good friends of mine. ☐ I do not have any friends in this course.

31. Please specify if you belong to a group from below

a. Do you belong to a sports team? (Select an answer from the following options)

☐ Yes ☐ No

b. Do you belong to a religious group? (Select an answer from the following options)

☐ Yes ☐ No

c. Do you belong to a musical group? (Select an answer from the following options)

☐ Yes ☐ No

d. Do you belong to a theater group or something similar? (Select an answer from the following options)

☐ Yes ☐ No

e. Please state if you belong to a different group, besides those mentioned above (Box to type in)

32. When you have a task to be done in groups, do you like to compete or cooperate with others? (Select an answer from the following options)

☐ I prefer to compete to have better results. ☐ I prefer to cooperate to have better results.

33. What would the other students say about you? (Select an answer from the following options)

☐ You help others a lot. ☐ You help others only occasionally. ☐ You never help others.

34. If you needed something, do you think the other students would help you with it? (Select an answer from the following options)

☐ Yes, I am sure. ☐ I am not sure. ☐ Nobody would help me.



35. Do you care about what the others think of you? (Select an answer from the following options)

☐ I care about it very much. ☐ I care about it a little ☐ I do not care

36. If your friend damages a personal belonging that he or he borrowed from you, What would you do? (Select an answer from the following options)

☐ I would forgive my friend because they did not mean to damage it. ☐ I would not lend them my personal belongings anymore, but we would still be friends. ☐ I would get mad and I would not want them to be my friend anymore.

37. Do you think that you can rely on your friends? Or do you have to be very cautious instead? (Select an answer from the following options)

☐ I can rely on my friends. ☐ I have to be very cautious.

38. Do you think that you can rely on other people? Or do you have to be very cautious instead? (Select an answer from the following options)

☐ I can rely on other people. ☐ I have to be very cautious.

39. Generally, do you think you are someone that ... ? (Select an answer from the following options)

☐ likes to take risks. ☐ prefers to avoid risks.

Well done! You have successfully finished this activity. Thank you for your participation.



## Chapter 3

# Religious Identity and Altruistic Giving: A Field Experiment with Children in India

### 3.1 Introduction

There is substantial generosity across the world (CAF, 2018). About 50 percent of the population offer help to strangers, almost 30 percent donated money, and 20 percent volunteered their time. According to the World Bank, in 2018 remittances accounted for US\$689 billion, while US\$27 billion were invested in humanitarian assistance. Understanding why people voluntarily contribute to charitable behavior is important to the design of policies that encourage increased generosity.

In this paper we study the motivations for altruistic behavior among children. We make two contributions to existing research (see a review by Sutter et al. (2019)). First, we investigate the motivations for giving among children aged between seven and 17. The theory of pure-altruistic preferences assumes that individual donations are motivated solely by the interest in the welfare of the recipient (Becker, 1976). This model implies that third-party contributions generate a one-to-one crowding out in donations (Warr, 1982). On the other hand, Andreoni (1989, 1990) proposed that donations are motivated by the warm-glow or the utility that the donor experiences for donating. Hence, as donations are motivated by an egoistic motive, there is no perfect crowding out of third-party donations. In this paper we examine how those motivations change with the cognitive development of children.

The second contribution that we make is that we consider how the motivations for giving are affected by the identity of the donor. Ample empirical evidence has identified that individuals display parochial altruism, discriminating in favor of in-groups and against out-groups (Bernhard et al., 2006; Fehr et al., 2013; Corr et al., 2015; Willard, 2017; Chiang and Wu, 2015). We trace the origins of that form of discrimination by investigating the motivations for giving to different groups and how those motivations change with age.

The context of our study is Mumbai, India. In this city there is an extensive segregation of

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This chapter is joint work with Marcela Ibañez and Pooja Balasubramanian.

religious groups, and it has experienced violence during the last decade. In addition to mass rioting, there is evidence of systematic institutional discrimination toward Muslim minorities in economic and social spheres, e.g., access to public goods (Banerjee et al., 2005), exclusion in education and labor markets (Deshpande and Sharma, 2016; Sachar, 2006), and lack of economic mobility (Asher et al., 2018). Therefore, this context provides an ideal case to study the role of identities in social preferences, particularly its impact on the decisions among children of different ages. To elicit how motives for giving could be affected by the identity of the recipients, this study is implemented in areas with a high concentration of either Hindu or Muslim populations.

To disentangle the role of pure-altruism and warm-glow, we use a modified version of the experimental design by Ottoni-Wilhelm et al. (2017a). We invite children to complete a survey on educational aspirations and pay them to complete the survey in the form of school materials. We then ask the children if they would be willing to donate part of the materials they received to support a charity that works with disadvantaged children. Following Ottoni-Wilhelm et al. (2017a), we present to each participant six scenarios that vary the value that they receive and the value that we donate to the charity. This allows us to disentangle the role of pure altruism and warm-glow using a structural estimation of the utility function.

The experimental design uses also a between-subject variation in which participants are randomly allocated to one of three treatments. In the treatments, we vary the frame used to present the charity. In the control treatment, donors receive a flyer with information about the charity that contains pictures of the library of the beneficiary school. The other two treatments present the same information about the charity and some pictures of school-age children of either a Hindu or a Muslim school. To compare the in-group and out-group effects, we conduct the experiment in schools with mainly Hindu or Muslim children.

We find that warm-glow preference is the most important motivation of giving among children. As children grow older, both warm-glow and pure altruism grow in importance compared with selfish motivations. Yet, pure altruism motivation is stronger for older children. We find that, for younger children, the motivations for giving do not depend on the identity of the beneficiary. Additionally, children aged between 14 and 17 display a higher degree of pure altruism toward the out-group than the in-group. Hence, participants in this group experience a larger degree of crowding-out of donations toward out-groups than in-groups.

In addition to the altruistic preferences of the children, we also measure the warm-glow and pure altruistic motivations of their parents. We find that for both mothers and fathers, the warm-glow motivation for giving is more important than pure altruism. In addition, we find a high degree of correlation between the altruistic preferences of parents and children.

We contribute to the empirical literature that investigates the motivations of voluntary giving. Previous papers tested theories of pure altruism (Ribar and Wilhelm, 2002; Eckel and Grossman, 2005; Bolton and Katok, 1998), warm-glow (Crumpler and Grossman, 2008), or a combination of both (Tonin and Vlassopoulos, 2014; Konow, 2010). The closest paper to ours is Ottoni-Wilhelm et al. (2017a), who use a lab experiment and a structural estimation of the utility function to disentangle different motivations of giving. We contribute to this literature by investigating how warm-glow and pure altruism vary toward recipients of different identities, and also how those motivations vary for children of different age groups.

A relatively large body of literature has documented in-group favoritism and out-group discrimination ([Akerlof and Kranton, 2000](#); [Kranton, 2016](#); [Dotterer and Lowe, 2015](#)). Similar to [Bauer et al. \(2014\)](#), we consider how norms of discrimination develop in children. We complement this research by investigating whether discrimination is associated with different norms of altruism. The emphasis of our study is religious discrimination in India.

## 3.2 Literature Review

The notion that norms of altruism affect behavior can be traced back to Adam Smith who wrote in the *Theory of Moral Sentiments* (1776): "However selfish man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though they derive nothing from it except the pleasure of seeing it." Such a sympathy-driven motivation for voluntary acts was also propounded by [Arrow \(1977\)](#) and [Sen \(1977; 1985\)](#). [Becker \(1976\)](#) attributed properties of voluntary contribution to the increase in donor's utility by imagining how the recipients of the public good are benefiting. As a result, donation create a positive externality which can be modeled as a public good. [Bergstrom et al. \(1986\)](#) and [Warr \(1983\)](#) show that this type of motivation for giving generates a one-to-one crowding out of giving when donations of a third party increase. Empirical data revealed that any government grants did not result in the complete crowding out of private transfers, but instead, people continued to donate.

[Andreoni \(1989; 1990\)](#), in the nineties, disentangled the motivations of voluntary giving into warm-glow, pure altruism, or a combination of both by introducing a model of impure altruism. He proposed that voluntary giving was associated not only with pure altruistic motivation but also with a warm-glow motivation, by which individuals derived utility from the act of giving. One implication of warm-glow motivation of giving is that individuals would donate irrespective of government grants, or any other third-party. A series of studies followed Andreoni proving the non-existence of the complete crowding-out hypothesis. An earlier study by [Ribar and Wilhelm \(2002\)](#) reviewed this theory using experiments in the lab and actual donations by people to real charities and found that, despite the large membership base of charities, people continued to donate. Thus, the increase in the number of members and donations to the charity increased individual contributions, supporting the warm-glow motivation of giving.

[Eckel and Grossman \(2005\)](#) – EG – introduced a novel method to disentangle warm-glow motivation in charitable giving. They implemented a fiscal illusion treatment whereby in one group people were aware that a tax deducted from their earnings was given to a charity and their earnings would have been higher without the tax deductions. The other group was unaware that part of their initial earnings had been deducted as a tax to a charity. This degree of fiscal illusion impacted the donation decisions of the participants. EG find that under fiscal illusion there was incomplete crowding out, however, when the participants were aware of the use of the tax deductions, i.e., no presence of fiscal illusion, the results were close to a complete crowding out.

[Crumpler and Grossman \(2008\)](#) – CG – introduced a unique method to isolate and elicit warm-glow giving. A participant was given the option to donate to the charity of their choice,

however, the amount that the specific charity would get was fixed *ex ante*. Any amount donated by the participant would have been complemented by the researcher to fulfill the criteria of the fixed amount. Since donating could not impact the total amount of funds to the charity, a pure altruistic individual was not expected to donate any amount, whereas a pure warm-glow individual would donate despite the crowding effect that this would generate on donations of the research team. The results showed extensive warm-glow motivations, wherein 57 percent of the participants donated and, on average, the donations amounted to 20 percent of their endowment. [Tonin and Vlassopoulos \(2014\)](#) included two additional treatment to the CG design wherein one group considered the recipients to be the researchers, the other treatment tested for baseline altruistic preferences. They found no significant difference in giving when the recipient was either the charity or the experimenter. This result supports the warm-glow argument wherein people's donations were highly motivated by their individual giving, irrespective of any change in policy or neediness of the recipient. The giving under warm-glow was consistent.

Some of the reasons motivating voluntary contributions were considered to be reputation, prestige, and social image ([Kumru and Vesterlund, 2010](#); [Andreoni and Petrie, 2004](#); [Harbaugh and Krause, 2000](#)). Other studies found that social approval ([van de Ven, 2002](#)) and the importance of communication ([Xiao and Houser, 2005](#); [Andreoni and Rao, 2011](#)) are positively correlated with an increase in giving, but an increase in the social distance of the recipient is negatively correlated with charitable giving ([Roth, 1995](#); [Hoffman et al., 1996](#); [Bohnet and Frey, 1999](#); [Rotemberg, 2014](#)). The Familiarity Hypothesis ([Konow, 2009](#)) is used to explain greater donations toward recipients who are closer in terms of identities, e.g., race, ethnicity, citizenship ([Gangadharan et al., 2014](#)).

Ample empirical evidence has suggested that social identity that might be induced ([Kranton et al., 2013](#); [Chen and Li, 2009](#); [Costard, 2011](#); [Corr et al., 2015](#); [Ahmed, 2008](#); [Pan and Houser, 2013](#)), is pre-existing ([Chai et al., 2011](#); [Goette et al., 2006](#); [Chakravarty et al., 2016](#); [Hoff and Pandey, 2006](#); [Friesen et al., 2012](#)) or affects social preferences. Studies particularly have found in-group favoritism or out-group discrimination among adults when the identity of the recipient is revealed.<sup>1</sup> By making existing identities salient, [Chakravarty et al. \(2016\)](#) found that religious homogeneous villages have greater cooperation and [Selten and Ockenfels \(1998\)](#) observed greater altruism and reciprocal intentions toward in-group members in various solidarity games.

The importance of Familiarity and Social Identity ([Tajfel and Turner, 1979, 2019](#)) has been observed among children from the age of five years ([Banerjee et al., 2005](#)). It was found that as children grow older, they increase altruism and decrease envy and spite toward recipients who belonged to the in-groups ([Friesen et al., 2012](#); [Angerer et al., 2015b](#)). This in-group bias is seen to increase in regions where individuals experienced conflict. This was observed by [Bauer et al. \(2014\)](#) who identified children exposed to conflict and found a significant increase in giving to the in-group compared to the out-group among those participants who had the most exposure to the conflict.

However, none of the studies observe whether the above motivations impact pure altruistic or warm-glow giving. Through this study, we show how the saliency of religious identities, in

<sup>1</sup>[Kranton et al. \(2013\)](#) find that participants willing to destroy the social welfare of a member from the out-group at their own cost.

cultural contexts where these identities are prominent, can motivate pure altruism and the warm-glow preferences of giving, respectively.

Apart from the importance of identity, we consider another strong motivation for voluntary giving – the role of age. The development of social preferences in childhood has been studied extensively in both psychology (Fabes and Eisenberg, 1998) and economics (Fehr et al., 2008). Most of the studies unanimously agree that social preferences such as inequality aversion (Fehr et al., 2008), generosity, altruism (Gummerum et al., 2010; Harbaugh et al., 2003a), and fairness (Almås et al., 2010) increase with age. A recent literature review on the development of prosociality can be found in Fehr et al. (2013) and Angerer et al. (2015b). We contribute to this line of research investigating how motivations for giving develop with age.

Two papers close to our study are by Liebe and Tutic (2010) and List and Samak (2013) who disentangle motivations for giving in children in Germany. Liebe and Tutic (2010) conduct an artefactual field experiment in primary schools in Germany to study the effect of social status (determined by the type of schooling – Hauptschule, Realschule, Gymnasium and private Gymnasium in increasing order of social status) on voluntary contribution of children. They played dictator games and hypothesized that pure altruism is prevalent when high-status schools donate more than low-status school children and receive less compared to the latter. Warm-glow will persist if donations remain constant, irrespective of the income status of the recipient. The results showed support for warm-glow preference of giving, whereby particularly students from high-status schools gave consistent amounts to both high-status and low-status recipients. Unlike them, in our study, the deservingness of the recipient (socioeconomic conditions of recipient) remains constant. We elicit warm-glow and pure altruism for children of different religious identity treatments. List and Samak (2013) measure warm-glow giving among very young children (aged three to five). They rejected warm-glow motivations of giving as children donated less to teddy bears than to other children. In our study, we consider a longer age range (7 to 17 year-olds) and can also trace motivation. Additionally, we estimate the relative importance of warm-glow and pure altruism.

Our contribution to existing research is threefold. First, we measure the relative importance of pure altruism and warm-glow as motivations for voluntary giving among school age children. Second, we study how motivations for giving change according to the identity of the recipient. Third, we study how the social background affects the different motivations for giving.

### 3.3 Conceptual Model

The conceptual framework follows the empirical strategy of Andreoni (1990) and Ottoni-Wilhelm et al. (2017a). In this model, we consider an economy in which individuals are endowed with wealth  $w_i$  that they can allocate between the consumption of a private good,  $x_i$ , and a contribution to a charity good,  $g_i$ . Let  $n$  be the total number of individuals in the economy and  $G = \sum_{i=1}^n g_i$  the total amount of charity goods generated. Following the model of impure altruism by Andreoni (1990), the utility function can be written as follows,

$$U_i = U(x_i, G, g_i); \quad \forall \quad i = 1, \dots, n \quad (3.1)$$

where  $U_i$  is assumed to be a continuous and strictly quasi-concave function of its components. This model of impure altruism implies that the utility depends on the consumption of the private good, the total charity goods generated, and the own contribution to the charity good. Assuming an homogeneous Cobb-Douglas utility function of degree 1, Equation 3.1 can be written as follows,

$$U(x_i, G, g_i) = (1 - \alpha - \beta) \ln x_i + \alpha(\ln G) + \beta(\ln g_i) \quad (3.2)$$

where  $0 < \alpha < 1$  represent the measures of pure altruism obtained from the total value of the charitable good. Furthermore,  $0 < \beta < 1$  represents the degree of the warm-glow from own contribution to the charity. For a pure altruist individual,  $\alpha$  should be positive and  $\beta$  equal to zero, whereas for a warm-glow individual,  $\alpha$  might be zero and  $\beta$  positive.

Equation ?? is subject to the budget constraint:

$$x_i = w_i - g_i; \quad \forall \quad g_i = G - G_{-i} \quad (3.3)$$

$$Z_i = w_i + G_{-i} \quad (3.4)$$

In Equation 3.4,  $Z_i$  represents the donor's social income, i.e., combination of own income  $w_i$  and giving by others,  $G_{-i}$ . Based on the theoretical framework of Becker (1976), Andreoni (1989), and Ottoni-Wilhelm et al. (2017a), the charity good in this model has the properties of a public good, namely both non-excludability and the generation of positive externalities<sup>2</sup>.

Substituting the budget constraints 3.3 in Equation 3.2, the donor's maximization problem can be written as follows,

$$\max \quad U(x_i, G, g_i) = (1 - \alpha - \beta) \ln (Z_i - G) + \alpha \ln (G) + \beta \ln (G - G_{-i}) \quad (3.5)$$

The first order conditions can be solved the implicit demand functions for the total amount of public good:

$$G^* = (-1) \frac{1 - \alpha - \beta}{Z_i - G} + \frac{\alpha}{G} + \frac{\beta}{G - G_{-i}} = 0 \quad (3.6)$$

In terms of the individual's giving, the predictions of warm glow and pure altruism within an impure altruism model can be rewritten as:

$$g_{ib}^* = -G_{jb} + 0.5[(1 - \beta)G_{jb} + (\alpha + \beta)Z_{ib} + \{(1 - \beta)G_{jb} + (\alpha + \beta)Z_{ib}\}^2 - 4\alpha G_{jb} Z_{ib}]^{1/2} \quad (3.7)$$

The optimal level of the private contribution to the charity good,  $g_{ib}^*$ , will be used later in the empirical estimation of the parameters  $\alpha$  and  $\beta$ .

Next, we postulate certain hypothesis for these parameters,  $\alpha$  and  $\beta$ , by age and identity.

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<sup>2</sup>We assume that a third-party contribution to the charity good creates a positive externality on the donor who gains utility even when they do not contribute on their own for the same good.



### 3.3.1 Hypothesis

In addition to obtain individual estimates of pure altruism and warm glow, the objective of the paper is to study how motivations for giving change with age and with social identity of the recipient.

**Hypothesis 1:** Pure Altruism,  $\alpha$ , and warm-glow,  $\beta$ , increase with age.

List and Samak (2013) found evidence of pure altruism but not warm-glow giving among children (aged 3 to 5), thus providing evidence of a fundamental nature of pure altruistic preferences. Since pure altruism is concerned with efficiency regarding the production of the public good, a higher cognitive capacity would be required to evaluate it. As the bandwidth to assess the cost and benefits of contribution toward the good increases with age, we postulate a pure altruism parameter to increase among older children. In addition, a study by Harbaugh et al. (2007) reveals that as children grow older they understand the concept of free riding and are also more aware of fairness, distributive concerns (Benenson et al., 2007; Fehr et al., 2008), and the presence of multiple donors (Guzmán et al., 2014). As a result, when children grow older, they could be more prone to acting in a pure altruistic manner, since it reduces the inequality between themselves and the recipients.

On the other hand, warm-glow is considered to be a consequence of repeated socialization which might develop only with time, thus warm-glow is more prominent among adults. Furthermore, concerns regarding social image is also higher among older children. Therefore, in our sample, which considers children aged between seven to 17, warm-glow is hypothesized to increase with age. The prediction is additionally supported by the socialization theory suggested in a study by Liebe and Tutic (2010). They find that adolescents in schools reveal greater warm-glow preferences of giving. Since they do not have a variation across ages, the study is unable to provide conclusions on the role of age on such preferences. Finally, if we assume that pro-sociality and altruism generally increase and occur through sympathy for other individuals (Smith and Sen), we would expect to see an increase in both pure altruism and warm-glow. We expect an overall increase in both motivations of altruism plausible as there is sufficient empirical evidence of increasing altruism with age (Angerer et al., 2015a,b; Cárdenas et al., 2014; Kosse et al., 2019). However, we go one step further and disentangle the pure altruism and warm-glow as motives for giving.

**Hypothesis 2:** We expect that both altruistic motives (warm-glow and pure altruism) will be higher toward the in-group than toward the out-group.

Based on the Familiarity Hypothesis (Konow, 2010), the Social Identity theory (Tajfel and Turner, 1979), and the egotistical motivations driving warm-glow, we postulate that individuals gain utility from own contribution to the public good, particularly, when they give to recipients from their in-group. Therefore, on average, the magnitude of warm-glow is expected to be larger toward the in-group compared to the out-group. A paper by Hungerman (2009) shows that an increase in diversity, and thereby an increase in the social distance between the donor and recipient, yield to a decrease in warm-glow motivation. This is because people could not care about what others from the out-group would think about their behavior, thus warm-glow motivation, derived from status or reputation, no longer exists. Apart from voluntary contributions, studies have found less preference for redistribution when recipients belong to a

different ethnic group (Alesina and Ferrara, 2004; Fong and Luttmer, 2011).

Even if we assume that warm-glow can have non-egoistical motivations, e.g., sympathy, own contribution primarily to increase welfare in the society (Arrow, 1977), or a sense of commitment to the society (Sen, 1977), it would still not rule out the Familiarity Hypothesis which increases these non-egotistical motives depending on the closeness or familiarity to the recipient. Empirical and studies in neuroscience support these theories and show that empathy decreases when the recipient is from an out-group (de Vignemont and Singer, 2006; Meyer et al., 2013; Xu et al., 2009).

### 3.4 Experiment Design and Procedures

#### 3.4.1 Experiment Design

In this study, we implement a within-subjects design which allows us to disentangle different motivations of altruistic giving such as warm-glow, pure and impure altruism. We follow the design by Ottoni-Wilhelm et al. (2017a), where each individual has to make six decisions as presented in Table 3.1. In each situation, participants receive a fixed endowment, either 40 or 46 rupees, and can donate part of their endowment to a foundation that receives an initial donation from us.

This design allows the analysis of three main effects – subsidy, tax, and income effect at two different levels of donations from the third-party (researchers) to the charity. The subsidy effect measures the change in a participant’s donation when the initial endowment of the participant remains the same but the foundation’s initial donation increases by 6 units. This can be seen in budgets 1 and 2 (also 4 and 5). If participants are motivated by warm-glow preferences, donations should be the same in both budget scenarios. Second, a lump-sum tax effect when we compare donation decisions in budgets 2 and 3 (and 5 and 6). From Budget 3 to Budget 2, and from Budget 6 to Budget 5, 6 units are taxed from the participant’s endowment and are directly transferred to the foundation’s initial donation. If participants are purely altruistic, there would be a one-to-one crowding out. Finally, we analyze an income effect comparing budgets 1 and 3 (also budgets 4 and 6). In these decision sets, the foundation’s initial donation does not change while the participant’s endowment increases by 6 units.

TABLE 3.1: Experimental Budgets

Budget	Participant’s endowment ( $w_i$ )	Foundation’s fixed donation ( $G_{-i}$ )	Participant’s social income ( $G_{-i} + w_i$ )
1	40	4	44
2	40	10	50
3	46	4	50
4	40	28	68
5	40	34	74
6	46	28	74

We use this design to test two main hypothesis; the development of warm-glow and pure altruism for different ages and the effect of the social identity of the recipient. The experiment allowed us to obtain warm-glow and pure altruism measures for all the children since it was

within-subjects design. Furthermore, by implementing this experiment with 7 to 17 year-old children we are able to observe the age effect.

We implemented a between-subjects design in which we vary the the information regarding the identity of the recipients. One group of students received an abstract treatment flyer (no identity revealed), a second group received an in-group treatment flyer (they saw photos of potential recipients who belonged to their own religious group) and the third group of children received an out-group treatment flyer (they saw photos of potential recipients who belonged to a different religious group from their own).

### 3.4.2 Experimental Procedures

Children from grades 4 to 10 participated in one session that lasted approximately one hour during regular school hours, i.e., there was no self-selection on who participated in the experiments. However, children's participation was voluntary. Particularly in many Indian public schools, due to the large number of students, each class had at least three divisions. We randomized the identity treatments at the division level, and the altruism elicitation was undertaken for all the students.

In each session, the surveyors were introduced as researchers who were keen on studying the educational aspirations of young students. Accordingly, children were asked to complete a 30-minute educational survey and we informed them that all their answers and decisions would be treated and analyzed anonymously. The survey included some socio-demographic questions, a cognitive test,<sup>3</sup> and finally some questions on expectations and aspirations from education. These questions were later utilized for another study on expected educational returns.

After completing the survey, as a means of thanking children for their time, it was announced that each child would get some payment that could be redeemed in the form of school items such as pens, pencils, notebooks, etc. Before getting the payments for their participation, flyers were distributed to each child which had the information of an NGO that had been chosen prior to the experiment. This NGO had its presence across different states in India, and its objective was to help Indian children in need. On the flyer there were pictures of children aided by the NGO.<sup>4</sup> We asked them whether they would like to donate some of their payment for completing the survey to children from the NGO.

In each flyer, we presented six randomly ordered budgets as shown in Table 3.1 and some pictures. Since the selected NGO helped children across different religiously populated regions, we could show photos of either NGO facilities, only Muslim children or only Hindu children who were potential beneficiaries without deception. While the information remained the same, we implemented the three identity treatments. In the first treatment, called control group or abstract treatment, children saw photos of a school building and a library. In the other two treatments, children were shown photos of only Hindu recipients or children received photos of only the Muslim recipients of the NGO,. We called these treatments in-group if they received

<sup>3</sup>We selected a short version with 8 matrices of the original set of Standard Progressive Raven's Matrices (Raven et al., 1998)

<sup>4</sup>Information given about the NGO: "The NGO helps children and give them good schooling. They give books, pens and pencils to the children. The children come from poor families. Some of the children do not have homes. The NGO is located in Delhi, but they work in others parts of the country."

flyers with photos of children of their own religious group or out-group if they received the flyer with pictures of children belonging to the other religious group. We implemented the control treatment to elicit an average lower limit of giving relative to the religiously salient treatments. Treatment assignment was done at the classroom level. The flyer, including the pictures and the information provided (see Appendix B).

In each situation, children knew their endowment received from completing the education survey and the initial amount that the NGO received. They had to decide on the amount (from the amount they had earned) that they would like to give to the recipients of the NGO. It was announced that the amount left would be given to the participants. Although each participant makes the six decisions, only one is randomly selected to calculate payments.

At the end of this activity, each child randomly pick a colored ball from a bag with six balls that represented the six situations from Table 3.1. Payments were calculated in a separate room, and each children received a package with school items that corresponded to the amount of rupees that they kept for themselves. One week after the sessions, surveyors came back to each school and randomly selected around 60 percent of the children to implement interviews on the children's religiosity (see post-experiment Survey in Appendix B).

We also elicit the parents' pure altruistic and warm-glow preferences. Attached to the inform consent for parents, they received a survey and six questions (similar to those in Table 3.1), but without the identity component. They were also asked to answer a questionnaire about their social capital, and socio-economic information (see Appendix B).

The project received approval by the principals in each school. Moreover, we informed the parents and teachers about the general objectives of the project and the payments of the children. Additionally, parents were also informed that they could withhold their child's participation, but we did not receive any denials.

We ran the experimental sessions in eight randomly selected public school in Mumbai.<sup>5</sup> To distinguish between in-group and out-group social preferences, we selected half of the schools located in neighborhoods with a high proportion of Hindu population, and the other half in areas that were highly Muslim-dominated. In our study, we attempt to capture an extreme form of discrimination, if any. As a result, we ensured that our sample came from extremely segregated localities and particularly from areas that had experienced the riots in 1992–93. Mumbai is comprised of multiple administrative wards which are under the purview of the local municipality (BMC). Each ward has multiple localities that are extensively segregated by ethnicity and income. Within each ward, we selected areas that are either highly Hindu- or Muslim-dominant. Since we do not have information on the population composition by religion at the ward level, our selected Hindu and Muslim locations are based on detailed focus group discussions by our enumerators with various stakeholders, such as citizens living in these areas and the officers at the municipality level.

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<sup>5</sup>In total we have 8 schools - Maroli church (Muslim), Anjuman Islam (Muslim), Jaffri (Muslim), SIES (Hindu), Mori road (Muslim), Sewri (Hindu) and Mahalaxmi (Hindu), Amarnath (Hindu).

## 3.5 Results

### 3.5.1 Descriptive Statistics

In this section, we provide an insight into the socio-demographic characteristics of our sample as well as their decisions in the experiment. Table 3.2 displays the mean values for the characteristics of our sample across the three treatment groups; namely abstract, in-group and out-group. The first panel of Table 3.2 describes the characteristics of our sample. Across all three treatment groups, girls comprise of 48 percent of the sample. The average age of the children is 12, 52 percent of the sample are children from the Hindu religion and the remaining are Muslims. On average, the children have three to four siblings and travel for 12 to 13 minutes to their school. The cognition variable denotes the number of correct answers entered in the Raven’s matrices test and, on average, children answered three to four questions correctly. The variable religiosity measures the frequency of visiting a religious shrine where 0 means never and 6 denotes every day. On average in our sample, children visited a religious shrine such as a temple or mosque a few times a month. All of the characteristics in our sample are balanced across the treatment groups (see the orthogonality test in Appendix Table 3.8).

Once children had completed their decisions and were given the gifts, we ask them in a post-experiment survey questions regarding the NGO and role of the charity (second panel of Table 3.2). As a result, these questions did not frame the students before making their donation decisions. Children who were exposed to the in-group treatment, on average, perceived charity to be good and they also consider that the NGO might be biased toward their own in-group<sup>6</sup>. These two relevant covariates might be a result of the treatment effect. Thus, it is possible that the respondents’ expectations of others as being prosocial is correlated with the treatment, i.e., the identity of the recipient. We consider this to be a sign of confirmation that our treatment assignment worked and that children in our sample recognized the recipients’ identity, i.e., in-group and out-group effects. Moreover, it is worthy to note that all students across the three treatments declared that they would increase their giving not only when there was a third-party subsidy but also when there was a tax imposed on them. Thus, descriptively, there is a tendency for the children in this sample to be more influenced by warm-glow giving. Finally, we asked the children for the reason why they had donated. Across the three treatments, the children said they donated because the recipients were poor. However, a higher proportion of students who were in the in-group treatment said that they donated because the recipients belonged to their own religion and this result is significantly different across the treatment groups (see Appendix Table 3.8).

In addition to the main survey and the post-experiment survey, we also spoke to the parents of the children and asked them a few questions. This household survey was conducted over the phone and included questions such as parents’ education, monthly income, risk and time preferences (non-incentivized), subjective opinions of the parents regarding equal opportunities for all social identity groups in India. Parents were also asked questions on their charitable giving patterns and whether their children were aware of these donations. Finally, we conducted the same experiment on donation decisions with the parents (see in Appendix A tables 3.9, and

<sup>6</sup>This is indicated by the variable ‘NGO favors in-group’.

3.10; and the questionnaire in Appendix B).

TABLE 3.2: Summary Statistics - Children

	Full sample Mean/sd	Neutral Mean/sd	Ingroup Mean/sd	Outgroup Mean/sd
<b><i>Socio Demographics</i></b>				
Female	0.48 (0.50)	0.49 (0.50)	0.49 (0.50)	0.47 (0.50)
Age	11.91 (1.88)	12.00 (1.92)	11.89 (1.82)	11.84 (1.92)
Age group	1.95 (0.72)	1.99 (0.75)	1.93 (0.70)	1.95 (0.71)
Hindu	0.52 (0.50)	0.52 (0.50)	0.50 (0.50)	0.55 (0.50)
Siblings	3.47 (1.98)	3.44 (1.53)	3.34 (1.40)	3.62 (2.70)
Distance to school (in minutes)	12.86 (11.27)	12.46 (15.34)	13.44 (9.48)	12.62 (8.18)
Nearest school (in minutes)	11.38 (104.13)	13.27 (112.33)	12.72 (110.44)	8.35 (88.96)
Cognition	3.44 (1.65)	3.49 (1.60)	3.40 (1.66)	3.43 (1.68)
Religiosity	3.71 (1.24)	3.74 (1.21)	3.80 (1.18)	3.59 (1.31)
Religious Fractionalisation	0.30 (0.21)	0.31 (0.21)	0.31 (0.19)	0.29 (0.21)
<b><i>Post experiment survey</i></b>				
Expectation	21.43 (11.14)	21.13 (11.05)	21.84 (11.03)	21.23 (11.34)
Familiar NGO	0.49 (0.50)	0.44 (0.50)	0.51 (0.50)	0.52 (0.50)
Charity is good	0.88 (0.33)	0.86 (0.35)	0.92 (0.27)	0.86 (0.35)
NGO favors in-group	0.67 (0.47)	0.66 (0.47)	0.77 (0.42)	0.58 (0.49)
Crowd-out (Subsidy)	0.10 (0.30)	0.08 (0.26)	0.11 (0.32)	0.11 (0.32)
Crowd-out (Taxes)	0.14 (0.35)	0.12 (0.32)	0.14 (0.35)	0.17 (0.37)
Social norm	0.15 (0.36)	0.15 (0.36)	0.14 (0.35)	0.16 (0.36)
Observations	1820	547	647	626

Notes; Mean values, Standard deviations in parenthesis. Expectation-continuous variable of own expectation regarding other's contribution. 'Familiar NGO' (1=Yes) - Is the NGO known to you? 'Charity is good' (1=Yes). 'NGO favors ingroup' (1=Yes). 'Subsidy' (1=Crowd-out) - Reduce giving under third party subsidy. 'Taxes' (1=Crowd-out) - Reduce giving under compulsory tax. 'Follow social norm' (1=Yes)

The frequency table, Table 3.9, provides information on the work status of the parents, the class distribution of the children across treatments, and the mode of transport used to travel to school. The means of transport is also used as a proxy in our analysis to control for the income status of the household and is used as a control in the robustness checks.

For the entire sample, 41 percent of the fathers have permanent employment in offices, 24 percent are daily wage earners, 25 percent of the respondents' fathers owned either a small or a large business, and 71 percent of the mothers in the sample were housewives. Table 3.10 also provides information on certain subjective beliefs of the fathers and mothers. On average, 20 percent of the fathers and mothers have experienced discrimination. Although 90 percent of our sample of parents say they undertake charity, only 20 percent discuss their charitable giving with their children. When asked if all religious and caste groups should have equal access to education and work, only 30 percent of the sample agreed with this statement. Moreover, when they were asked if minority religious and caste groups face discrimination at work and education, 60 percent of mothers and fathers agreed to this statement.

Next, we discuss the mean giving of the children and their parents for each of the donation decisions in the game. Figure 3.1 and Figure 3.2 display the mean proportion of income donates. The initial endowments for children were Rs.40 or Rs.46 and for parents were higher – Rs.100 and R2.106.

In the pure altruism model, a compulsory tax will crowd out private donations. To identify whether the children are purely altruistic, we compare Budgets 3 and 2 (6 and 5). We found that a compulsory tax of 6 monetary units decreases private donations by 1.37 units and 2.14 units for low and high level of giving by others respectively. Thus, a tax in our sample results in a less than one to one crowding-out effect ( $p=0.000$ ). When we compare the crowding-out between low and high level of giving by others, this difference is not significantly different ( $p=0.159$ ). For parents, there is no response to a decrease in giving by others (at low levels of giving by others) and a proportion of the income donated decreases by 0.1 units (at high levels of giving by others). Similar to [Ottoni-Wilhelm et al. \(2017a\)](#), we find a significant difference in crowding-out between low and high levels of giving by others ( $p=0.000$ ). Thus, we can reject the null hypothesis of complete crowding out (ot pure altruism model) for parents in our sample.

Additionally, comparing Budgets 1 and 2 (4 and 5), we can assess the impact of the third party 'subsidy' on donations. In a pure warm-glow model, when donor's income remains unchanged, the private donations are expected to remain constant regardless of the amount donated by others. We find that at low levels of giving by others, children decrease their donations by 0.03 units and this result is not significantly different from zero ( $p=0.92$ ). However, at high levels of giving by others, private donations reduces by 1.18 units ( $p=0.002$ ). Thus, at low levels of giving, children tend to reveal pure warm-glow preferences and exhibit impure altruistic preferences at high levels of giving by others. For parents, an increase of one unit from the third party to the charity decreases their giving by 0.84 units for low levels of giving by others ( $p=0.007$ ) and by 0.71 for high levels of giving by others ( $p=0.01$ ). Since these differences are significantly from zero, an impure altruism model fits better the motivations of parents' altruistic giving. Last, Budgets 1 and 3 (4 and 6) allow us to elicit the pure income effect, i.e., proportion of income donated when there is an increase in own income. In order to obtain a more robust measure of



pure altruism, warm-glow and the income effect we undertake a structural estimation in the next section.<sup>7</sup>

FIG. 3.1: Average Giving

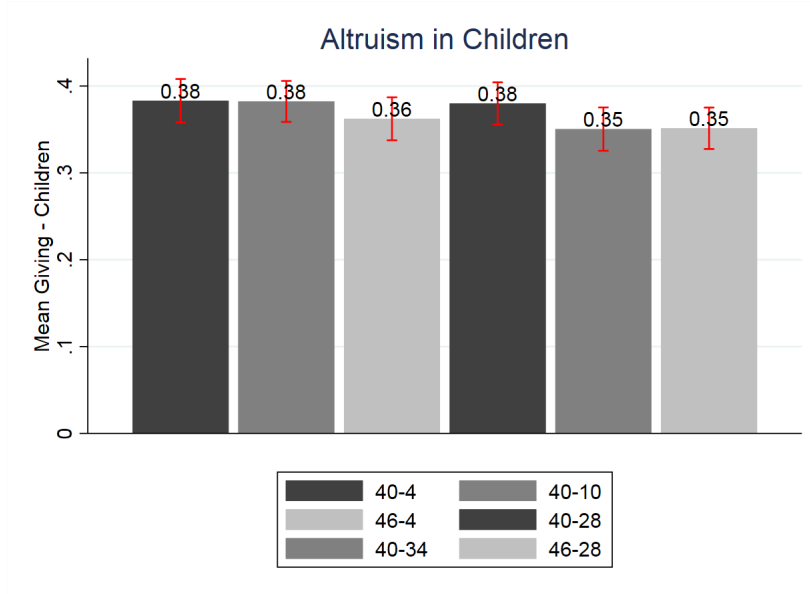
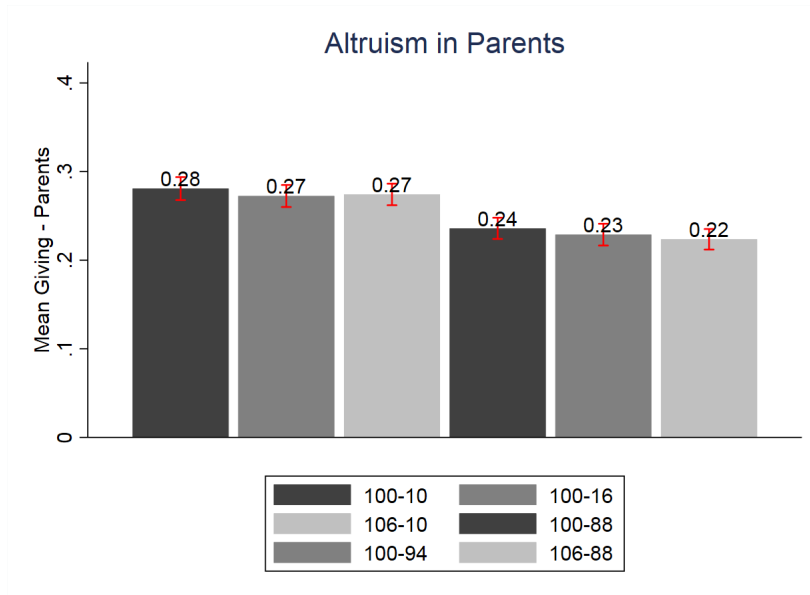


FIG. 3.2: Average Giving



<sup>7</sup>Figures 3.4 and 3.5 in the Appendix display the Kernel densities for children's decisions and their parents. These figures depict the difference in the distribution of giving before and after a subsidy or tax. For children, the left side of the figure reveals the tax effect and the two distributions are not significantly different based on the Kolmogorov-Smirnov test for the equality of distributions. The right side of the panel shows the change in distributions under indirect subsidy effect. The KS test is significantly different under an indirect subsidy and the giving after the subsidy skewed the distribution to the right. These figures already provide a picture of the extent of the incomplete crowding out on average in the abstract treatment. Thus, giving decreases by 1 rupee in the subsidy condition and 2 rupees in the tax condition revealing incomplete crowding out (as opposed to a theoretical complete crowding-out of 6 rupees).



### 3.5.2 Empirical Strategy

In this section, we estimate the parameters of the Cobb-Douglas impure altruism utility function from Equation 3.2. The optimal giving,  $g_{ib}^*$ , derived from the implicit demand function (Equation 3.6) is written as follows,

$$g_{ib}^* = -G_{jb} + 0.5[(1-\beta)G_{jb} + (\alpha+\beta)Z_{ib} + \{[(1-\beta)G_{jb} + (\alpha+\beta)Z_{ib}]^2 - 4\alpha G_{jb}Z_{ib}\}^{1/2}] + e_i + u_{ib} \quad (3.8)$$

We follow the theoretical model of [Ottoni-Wilhelm et al. \(2017a\)](#) where  $i = 1, \dots, N$  is the total sample size,  $b = 1, \dots, 6$  indexes the six decisions that each participant makes when given the amount of giving by others is ( $G_{jb}$ ) and own income is ( $w_{ib}$ ).  $Z_{ib}$  is the social income in the economy.  $e_i$  is the individual-specific random effect and  $u_{ib}$  is the randomness in each participant's giving that is not correlated across their six decisions. We utilize the above first order condition to obtain an estimation of the coefficient of pure altruism, ( $\alpha$ ), and the coefficient of warm-glow, ( $\beta$ ).

In order to calculate the average estimated of pure altruism,  $\alpha$ , and warm-glow,  $\beta$ , for the entire sample as well as for subsamples, we use the maximum likelihood routines assuming the error terms  $u_{ib}$  and  $e_i$  to be normally distributed ([Cappellari and Jenkins, 2006](#)). Thus, similar to [Ottoni-Wilhelm et al. \(2017a\)](#), we calculate the likelihood of optimal giving accounting for corner solutions using a non-linear random effects Tobit model for the entire sample.<sup>8</sup> Table 3.3 shows the estimate for pure altruism to be 0.10 which is smaller than the warm-glow component ( $\beta$ ) 0.289. Since the warm-glow coefficient is significantly different from zero, the pure altruism model can be rejected. The correlation coefficient,  $\rho$ , is 0.63 ( $p=0.008$ ). This shows that there is substantial heterogeneity in the error term for within-participants decisions.

Apart from the analysis of the entire sample, we delve into what drives this heterogeneity across individuals using survey responses. We estimate models to analyze the effect of age on altruistic preferences (Table 3.4), the religious identity of the recipient (Table 3.5), and finally the interaction term of age and treatment on altruistic preferences (Table 3.6). Each of the models are discussed in detail in the following subsection.

TABLE 3.3: Altruistic Preferences- No linear random effect Tobit estimation

	Coefficient	Standard Error	p -value
$\alpha$	0.10	0.0102	0.000
$\beta$	0.289	0.008	0.000
$\rho$	0.63	0.008	0.000

### Altruistic Preferences and Age

In order to understand the pure age effect, Table 3.4 presents the estimation for participants in the Abstract treatment without the identity confounds for different age groups. The last two columns of the table include the altruistic parameters of the fathers and mothers of the participants. The age groups are divided into three categories – group 1 (7 to 10 years), group

<sup>8</sup>The parameters are similar for both the Tobit and linear maximum likelihood estimations.

2 (11 to 13 years) and group 3 (14 to 17 years).<sup>9</sup> Column 1 in Table 3.4, the pooled measure of warm-glow ( $\beta$ ) is 0.34 and pure altruism ( $\alpha$ ) is 0.04. Thus, warm-glow proportion of giving is, on average, stronger for the entire sample compared to pure altruistic motivations.<sup>10</sup> The subsequent columns show the estimated coefficients of warm-glow and pure altruism by different age groups. Pure altruism, indicated by the  $\alpha$  parameter (top panel), is not significantly different ( $p=0.138$ ) for the youngest and middle age groups. The older cohort show a significant rise in pure altruistic motivations,  $\alpha = 0.12$ , and is significantly different from the middle age group ( $p=0.025$ ). Hence, we cannot reject the hypothesis (H1) that pure altruistic preferences increase with age. Column 5 shows that pure altruistic preferences for parents in the sample.

On the other hand, warm-glow preferences of giving, represented by the  $\beta$  parameters, are not significantly different for the youngest and middle age group. The oldest age group displays a decrease in warm-glow giving and the estimated coefficient is 0.264. The Wald test shows the coefficients of warm-glow are significantly different for oldest age group compared to the younger groups ( $p=0.000$  and  $p=0.001$ ). Thus, from our data, warm-glow preferences are stable until the age of 13, but we see a decrease in motivations for warm-glow giving for the older cohorts. Thus, we cannot accept our Hypothesis 1 that warm-glow increases with age. We observe a non-linear development of warm-glow preferences that are constant between 7 and 13 years, but begin to decline among children up to 17 years of age. The coefficient of warm-glow for parents,  $\beta$ , is 0.18. Additionally, overall for both the children and parents, warm-glow motivations of giving are stronger in magnitude than pure altruism.

### Altruistic preferences and identity of the recipient

In this section, we attempt to have a better understanding of how contextual factors might influence different altruistic motivations. Particularly in our experimental design, we make salient the religious identity of the recipient and observe whether motivations of pure altruism and warm-glow would be impacted. Identities, be it ethnic or religion, play a salient important role in different cultures. Therefore, we use the strongly embedded Hindu and Muslim identity in our study as a potential distinction between the in-group and out-group. In this section we analyze our three treatment groups. We compare children's decisions in a in-group treatment where participants can donate to potential recipients of the same religion, in the out-group treatment where participants make their donation to potential recipients of different religion, and in the abstract treatment which was discussed in the previous section. Keeping the deservingness of the recipients constant, we elicit how their religious identity might affect the altruistic preferences of the donor. Since the identity component follows a between-subjects design, in our analysis we compare the proportion of warm-glow and pure altruism, on average, across three treatment groups; abstract (no identity salient), in-group and out-group.

Table 3.5 includes  $\alpha$  and  $\beta$  estimates for each treatment; namely abstract, in-group and out-group. The hypothesis testing at the bottom the table are Wald tests for equality of coefficients across treatment groups for pure altruism and warm-glow, respectively. The maximum likelihood estimation for pure altruism is increasing across treatment and has a highest magnitude of

<sup>9</sup>The groups are divided based on the class categories such that the lowest group includes children in primary, the second group has secondary students, and the oldest cohort are higher secondary students.

<sup>10</sup>This result is in line with previous research that found warm-glow to be the stronger motivation to give.

TABLE 3.4: Altruistic Preferences - Age (Discrete)

	All	7-10ys	11-13yrs	14-17yrs	Parents
	(1)	(2)	(3)	(4)	(5)
	b/se	b/se	b/se	b/se	b/se
Pure altruism( $\alpha$ )					
Constant	0.042 (0.036)	0.035 (0.070)	-0.006 (0.060)	0.118** (0.057)	0.119*** (0.022)
Warm glow( $\beta$ )					
Constant	0.337*** (0.026)	0.362*** (0.051)	0.372*** (0.044)	0.264*** (0.040)	0.181*** (0.013)
sigma_m					
Constant	12.227*** (0.151)	11.776*** (0.273)	12.670*** (0.235)	11.859*** (0.282)	28.819*** (0.366)
Obs	544	155	242	147	517
Hypothesis testing	(2) vs (3)	(2) vs (4)	(3) vs (4)		
H0: $\alpha$	0.138	0.213	0.025**		
H0: $\beta$	0.783	0.001***	0.000***		

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

0.13 when participants donate to recipients from the out-group. Compared to the abstract treatment, pure altruism is increasing and significantly different for both the in-group ( $p=0.052$ ) and out-group ( $p=0.000$ ) treatments. However, there is no significant difference in pure altruism between the in-group and out-group treatment ( $p=0.123$ ). Thus, there is no significant difference in pure altruistic motives when the identity of the recipient changes from an in-group to an out-group. However, when the comparison is between an abstract treatment and saliency of identities, we find a significant increase in pure altruism and thereby preferences to ensure efficiency.

For warm-glow, i.e., the utility derived by an individual from own contribution, compared to the abstract treatment the estimated warm-glow parameters are smaller for the in-group ( $p=0.000$ ) and out-group ( $p=0.033$ ) treatments. However, there is no significant difference in warm-glow giving when we compare the in-group and out-group treatment ( $p=0.953$ ). Thus, considering the whole sample, we do not find any evidence of favoritism to the in-group or exclusion of the out-group. We can reject the Hypothesis 2 that warm-glow will be higher toward the in-group relative to the out-group.

### Altruistic Preferences by Age and Identity

In this section we estimate the marginal change in pure altruism and warm-glow for different age groups across the three treatments. From the previous analysis, we know that for our sample pure altruism increases with age and warm-glow diminishes. This decrease in warm-glow is only observed among the older cohorts and also the parents. However, it is stable for the young and

TABLE 3.5: Altruistic Preferences - Identity effects

	Baseline	Ingroup	Outgroup
	(1)	(2)	(3)
	b/se	b/se	b/se
Pure altruism ( $\alpha$ )			
Constant	0.042 (0.036)	0.093*** (0.028)	0.129*** (0.030)
Warm glow ( $\beta$ )			
Constant	0.337*** (0.026)	0.286*** (0.020)	0.287*** (0.021)
sigma_m			
Constant	12.227*** (0.151)	11.748*** (0.133)	11.812*** (0.136)
Obs	544	645	624
Hypothesis testing	(1) vs (2)	(1) vs (3)	(2) vs (3)
H0: Alpha	0.052	0.000	0.123
H0: Beta	0.000	0.033	0.953

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

middle cohorts. Furthermore, when the identity of the recipient enters the picture, warm-glow is decreasing compared to the abstract treatment (no identity treatment). In order to acquire a better understanding of this decreasing warm-glow trend and what drives it, we analyze the differences across age groups for each treatment.

The first column in Table 3.6 presents the results for the pooled sample. Columns 2, 3, and 4 display the results for each treatment. Irrespective of the identity treatment (Column 1), we observe that pure altruistic coefficients are higher for the middle and oldest age groups, while warm-glow decreases oldest group compared to the youngest group. In column 3 for the in-group treatment, pure altruism and warm glow are not significantly different across the three age groups. However, in the out-group treatment, pure altruism significantly increases for the oldest age relative to the youngest age group. Warm glow, on the other hand, significantly decreases for the oldest ages.

On comparing across treatments, there is no significant difference in both pure altruism and warm glow estimates for the youngest cohort. We find that pure altruism significantly increases for the middle age groups in both the in-group and out-group treatment ( $p=0.014$ ,  $p=0.069$ ) compared to the abstract treatment. Finally, there is an overall decrease in warm glow giving but this decrease is not significantly different across the treatment groups.

TABLE 3.6: Altruistic Preferences - Identity and Age

	All	Baseline	Ingroup	Outgroup	Hypothesis test		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	b/se	b/se	b/se	b/se	(2) vs (3)	(2) vs (4)	(3) vs (4)
Pure altruism ( $\alpha$ )							
11-13	0.043* (0.022)	-0.041 (0.093)	0.046 (0.071)	0.098 (0.078)	0.014	0.069	0.37
14-17	0.116*** (0.037)	0.083 (0.093)	0.106 (0.081)	0.160* (0.084)	0.269	0.291	0.466
Constant	0.040** (0.017)	0.035 (0.072)	0.045 (0.059)	0.040 (0.066)			
Warm glow ( $\beta$ )							
11-13	-0.044 (0.050)	0.009 (0.068)	-0.045 (0.050)	-0.080 (0.057)	0.74	0.233	0.037
14-17	-0.111*** (0.033)	-0.099 (0.067)	-0.089 (0.057)	-0.148** (0.060)	0.957	0.374	0.116
Constant	0.351*** (0.041)	0.362*** (0.053)	0.329*** (0.042)	0.364*** (0.049)			
sigma_m							
Constant	11.914*** (0.492)	12.204*** (0.151)	11.741*** (0.133)	11.790*** (0.136)			
Obs	1813	544	645	624			

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

### 3.6 Drivers of Altruism

Among the two studies that attempted to disentangle warm-glow and pure altruism, [List and Samak \(2013\)](#) found pure altruism to be the strongest motivation for giving among children aged between three to five. [Liebe and Tutic \(2010\)](#) observed giving by adolescents (aged between 14 and 18) and found a more strong motivation of warm-glow giving. Other studies that observe the development of social preferences in children predict altruism be driven by socialization, saliency of identities to increase with age, and a decrease of altruism when and social distance from the recipient increases ([Engelmann et al., 2018](#); [Shang and Croson, 2009](#); [Hoffman et al., 1996](#); [Bohnet and Frey, 1999](#)).

In our study, which observes warm-glow and pure altruism in children aged seven to 17 and their parents, we find pure altruism to be positively correlated with age. Warm-glow, however, decreases for children over 14. Nevertheless, warm-glow giving forms a larger share of the combined altruism measure. Regarding the identities, similar to previous studies we expected religious identities to have a strong impact on motivations of altruistic giving. Particularly, we hypothesized that warm-glow would be stronger toward recipients from the same religious group. On the contrary, we find warm glow to be decreasing both across age groups and treatments. On the other hand, pure altruism is significantly greater in both in-group and out-group treatment relative to the abstract group, only for the middle cohort.

In our experiment, the identity treatment was between-subjects wherein participants received

a picture of either a library and school buildings (no identity), photos of potential in-group or out-group recipients. One of the reasons why there is no evidence of in-group bias could be attributed to the weak identity treatment. However, using a post-experiment survey we asked the participants if they thought that the NGO favored children from their own religious group. We find that 78 percent of the sample in the in-group treatment recognized that the recipients belonged to their own religion, and this is significantly larger than the control and out-group treatments (Table 3.2).

We explore other potential mechanisms that are correlated with warm-glow and pure altruism. From the previous sections, on average, we do not find significant differences in donations toward a particular recipient group, but we do find that tendencies for warm-glow and pure altruism change when the religious identity of the recipient group changes, particularly for the middle age group. For this group, the decrease in warm-glow toward the out-group is significantly higher than the decrease in warm-glow toward the in-group ( $p=0.037$ ). For each treatment group, on average, we observe that the warm glow parameter decreases with age and this decrease is significant between the oldest and the youngest cohort. Despite these tendencies, the positive and significant ( $\rho$ ) parameter in Table 3.3 shows that there is substantial heterogeneity in the donors' random deviations from the model and subsequently heterogeneity across individuals in their  $\alpha$  and  $\beta$  parameters. We conclude that the participants have neither pure altruistic or pure warm-glow preferences, and there is a tendency to support Andreoni's impure altruism model. Therefore, we estimate the Cobb-Douglas specification for each individual in the sample and obtain  $\alpha$  and  $\beta$  for each one.

FIG. 3.3: Distribution of Individual Estimates

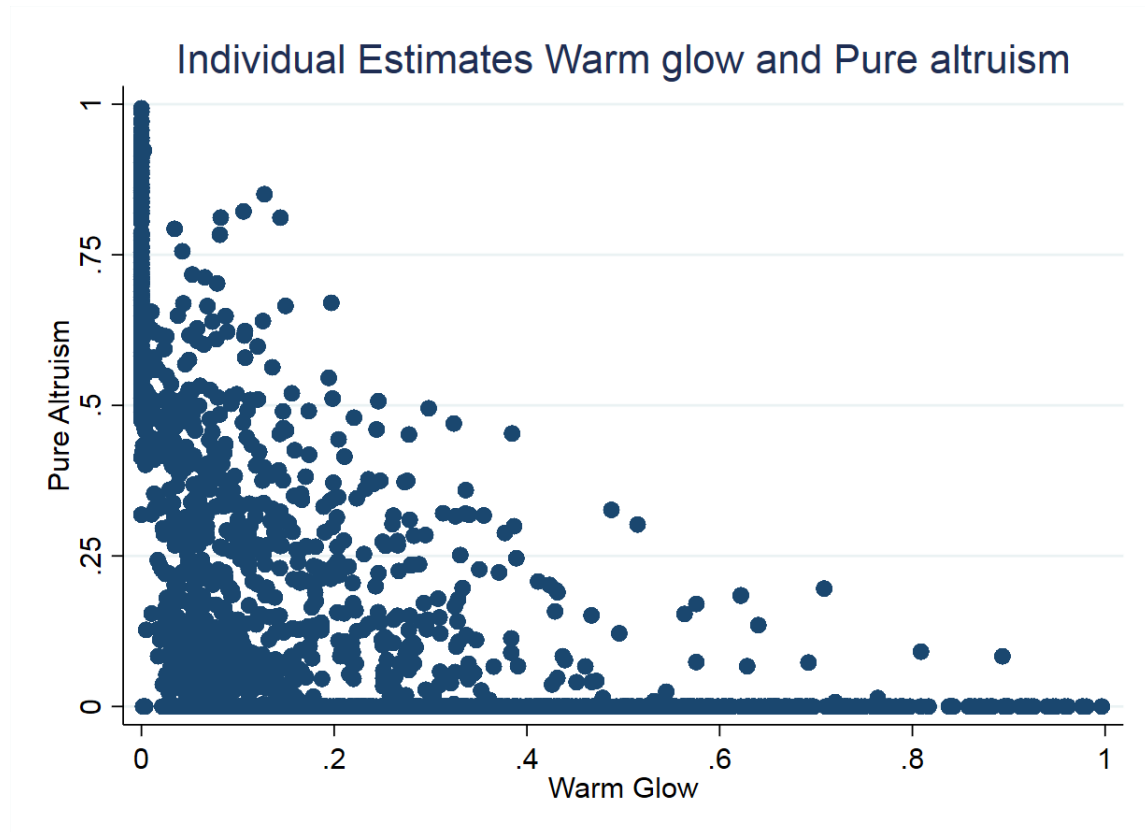


Figure 3.3 presents a distribution of altruism and warm-glow parameters at the individual level. On the extensive margin, we can classify individuals into three behavioral types; namely warm-glow, pure altruistic, and impure altruistic. We find that almost half of the individuals are either impure altruistic or warm-glow givers (on average, 45%). The pure altruistic givers across the treatment vary from 10 to 13 percent. We observe a slight increase in pure altruistic givers toward the out-group and decrease in the number of warm-glow givers toward the out-group. For the intensive margin, we observe the actual amount donated by the respondents. We find that even though a modest proportion of individuals are pure altruistic givers, the amount of their contribution is the highest (Rs.30). While the pure altruists decrease their giving to the out-group, on average, their donations are the highest, ranging from Rs.30.65 to Rs.28.82 for the in-group and out-group, respectively. This holds for children in the oldest age group (who reveal inclinations of in-group bias). Although most individuals in the sample have warm-glow preferences, their average donations to the recipient is significantly smaller (ranging from Rs.14 to Rs.16). Back-of-the-envelope calculations show that even though pure altruistic givers donate large amounts, the total amount donated by all those with higher warm-glow preferences is a significantly larger, i.e., 57 percent higher donations.

### 3.6.1 Other motivations for warm-glow giving

Given the high heterogeneity,  $\rho$  parameter, in our sample, and the large deviations not only across but within individuals, we create a new variable that measures the strength of warm-glow giving relative to the total measure of generosity,  $(\alpha + \beta)$ , for each individual. This term is based on the assumption that most of individuals are impurely altruistic and have a relative high degree of warm-glow associated to their charitable decision-making. We create an index of warm-glow similar to that of [Ottoni-Wilhelm et al. \(2017a\)](#) and it is defined as follows,

$$\gamma = \beta / (\alpha + \beta) \quad (3.9)$$

The index ( $\gamma$ ) ranges from zero (pure altruism) to one (pure warm-glow). We use this parameter  $\gamma$ , i.e., the degree of warm-glow preferences, as a dependent variable in the following sections. In this section, we estimate a simple OLS model to observe other covariates (controlling for age and recipient's identity). We estimate two models with the following dependent variables - degree of warm-glow (Column 1 in see Table 3.7) and the total altruistic giving (Column 2 in see Table 3.7). Since the errors of the two dependent variables could be correlated, we estimate a seemingly unrelated OLS regressions.

One channel we propose is the transmission of inter-generational norms of altruism, i.e., through parents and other adults. Based on the results in see Table 3.7, we find that warm-glow motivations of fathers are significant and positively correlated with the degree of warm-glow giving in children. This can be corroborated in other recent empirical studies that observe inter-generational preferences to be positively correlated, particularly with older children ([Ben-Ner et al., 2017](#); [Bettinger and Slonim, 2006](#); [Brown et al., 2014](#); [Ottoni Wilhelm et al., 2008](#)).<sup>11</sup>

<sup>11</sup>Theories on inter-generational transmission of generosity (altruism) have been proposed by [Becker et al. \(2016\)](#), i.e., children as an investment, and [Ottoni-Wilhelm et al. \(2017b\)](#) emphasize the parents' objective to make responsible citizens and generosity part of their identity

Apart from a strong correlation of altruistic motivations, the father's years of education is positive and significantly correlated to the warm-glow tendencies of the children. Past charity actions by both fathers and mothers are positively correlated with the children's warm-glow tendencies. However, this correlation is significant only for the fathers.

Another mechanism of warm-glow we propose is the importance of socialization through the role of peer expectations and beliefs regarding a social norm. We use first-order beliefs, e.g., we ask 'How much do you think your classmates have contributed?' and 'If others and others from your own religion gave more what would you do?' For the expectations variable, we find that the more they expect others to have contributed is correlated negatively with degree of altruism. Our measure of the social norm is based on the questions: 'Will you give the same amount as others in your class?' and 'Will you give the same amount as others from your own religion?' Finally, if they believe that the NGO is well known or favors only children from their own religion, we observe a significant and negative correlation with warm-glow tendencies.

Certain theoretical models explain religion as a means of creating a social context wherein people are aware of more opportunities to engage in charitable giving (Bekkers and Schuyt, 2008). It is also known to shape an individual's concern for others' well-being (Andreoni, 2006; Li, 2017). In our study we attempt to correlate the frequency of visiting a religious place with warm-glow giving and find a positive and significant correlation. In our study, we find actual charitable behavior by the father to be positively correlated with the child's tendency to be a warm-glow altruist.

### 3.6.2 Heterogeneous effects of mechanisms on altruistic giving

Although the above OLS regression reveals useful insights on potential mechanisms correlated with altruistic giving, it does not provide any information on how these mechanisms, e.g., socialization, degree of religiosity, parental opinions, and actual charitable behavior impact the children's prosociality across different age groups and for different identity treatments. In this subsection, we examine the covariates in Table 3.7 and estimate the effect of each of the above-mentioned mechanisms for different ages and treatments.

Table 3.11 shows how socialization and beliefs regarding the decisions of peer groups impact the degree of warm-glow giving across different ages and identity treatments. Column 1 shows the change in warm-glow giving when expectations regarding others' giving increases. We observe for the youngest and middle age groups, in the abstract treatment, the degree of warm-glow decreases as expectations of others' giving increases. Children from the oldest age group show significant increase in warm-glow giving when expectations about others' giving increases. While the degree of warm-glow for the youngest and middle age groups is not impacted by the expectation of others' giving in the in-group and out-group treatment, for the oldest age group an increase in the expectation of others' giving, increases warm-glow giving toward the in-group and decreases relative warm-glow giving toward the out-group. Additionally, for the oldest age group, if they expect their peers to give more, their warm-glow tendencies toward in-group increases but decreases toward the out-group.

In the post-experiment survey, we asked the students whether they would increase giving if others in their class increased giving (Column 2) and would they give more if others from



TABLE 3.7: Other explanations for warm glow and overall altruistic giving

	Degree of Warm glow	Altruism
	(1)	(2)
	b/se	b/se
Warm glow father	0.202*** (0.042)	
Warm glow mother	-0.059 (0.045)	
Altruism father		0.123*** (0.047)
Altruism mother		0.028 (0.052)
Female	-0.020 (0.037)	-0.048** (0.022)
Hindu	0.127*** (0.042)	-0.057** (0.028)
Siblings	-0.006 (0.011)	0.028*** (0.008)
Distance to school	-0.006*** (0.002)	0.009*** (0.001)
Cognition	0.005 (0.010)	0.021*** (0.006)
Religiosity	0.047*** (0.014)	0.017* (0.010)
Expectation	-0.002 (0.002)	0.004*** (0.001)
NGO favors ingroup (1=Yes)	-0.194*** (0.037)	0.038 (0.025)
Follow social norm (1=Yes)	-0.151*** (0.038)	-0.113*** (0.025)
Father's years of education	0.003 (0.004)	-0.004 (0.003)
Father recent charity	0.026 (0.049)	0.080*** (0.029)
Parent's beliefs on Religious Equality (1-Agree)	0.070*** (0.019)	-0.009 (0.013)
Constant	-2.109* (1.156)	-0.959 (0.763)
R squ.	0.211	0.275
Observations	672	762
Treatment dummies	Yes	Yes
Age controls	Yes	Yes

Notes: Dependent variable is degree of warm glow, total altruism.

Seemingly unrelated regressions. Robust standard errors in parentheses.

\* p<.1, \*\* p<.05, \*\*\* p<.01

their own religion gave more (Column 3). These questions elicit the willingness to follow a social norm. We find that students who agreed to follow the social norm of their class or own religious group also reveal significantly positive degrees of warm-glow giving towards their out-group. This correlation holds only for the oldest age group. Our findings are similar to other studies that show the impact of socialization and peer effects on children's prosocial decisions as they grow older (Banerjee, 2002; Engelmann et al., 2013; Harris, 1995; Grusec and Hastings, 2014).

Results from the last section show a positive correlation between religiosity and degree of warm-glow giving, we complement this relation across ages and by treatment. For the youngest and middle cohort, an increase in frequency of visiting a religious shrine is positively correlated with the relative degree of warm-glow giving. These estimates are significant only for the abstract treatment. For the oldest age group, we observe an increase in religiosity to be positively correlated with increased warm-glow giving toward the in-group. By observing subsamples across different age groups, we find a positive correlation between religiosity and warm-glow giving similar to other recent papers in the literature (Bekkers and Schuyt, 2008). In addition to religiosity, the past behavior of charitable giving by the fathers is observed to be positively correlated with warm-glow giving, particularly among the young and middle age groups. Table 3.17 shows a change in the degree of warm-glow giving if the parents of the children engaged in charitable work in the past. Columns 1 and 3 are estimates for parents' charitable giving in the past. Columns 2 and 4 denotes whether the child is aware of their parents' charitable giving. Particularly towards the out-group, the youngest and middle age groups exhibit a positive correlation with the relative warm-glow giving. However, this increase in parents' past charitable behavior is negatively associated with warm-glow giving amongst the oldest cohort. Moreover, if the child knows about their parents' inclination toward charity, the degree of warm-glow giving is negative in the out-group treatment for the oldest cohort. Thus, the positive spillover or intergenerational transmission of prosociality is not prevalent amongst the oldest children in our sample. This results find support in the psychology literature which shows that a child is heavily influenced by the parents in the initial years, but as the children grow older they are more influenced by peers and socialization (Banerjee, 2002).

Finally, we test our last mechanism, i.e., the intergenerational transmission of the subjective opinions of the parents regarding equal opportunities for all religious groups. We expect to observe a positive correlation between parents' preference for religious equality and the child's prosocial giving to recipients from the out-group. Table 3.15 shows a positive relation between the father's support of religious equality and the degree of warm-glow giving toward recipients from the out-group. This positive correlation is observed among the young and middle age groups but does persist for the oldest age group. This finding supports the psychological literature which establish that intergenerational influence is stronger amongst younger-age children and social norms and peer expectations gain importance for older children.

### 3.7 Conclusion

One of the main contributions of our paper was to observe the variation of altruistic giving motivations, particularly across children of different age groups. In addition, we attempted

to explain religious identity-based discrimination using these motivations of giving wherein a decrease in warm-glow motive was identified as the proxy for in-group bias at a very minuscule level. Previous studies that utilized existing identities found extensive evidence of in-group bias. This was found not only among adults but also children. Based on this empirical evidence, we were keen to observe whether there was an in-group bias among children of two prominent religious groups in India; namely Hindus and Muslims. Historically, there is evidence of systematic discrimination, segregation, and unequal access to public goods between these groups. Particularly, Muslims being the minority have faced extensive exclusion. Therefore, we were interested in observing whether this animosity had percolated in the minds of the youth.

In terms of economic policy implications, we find that voluntary contributions under external policies of direct taxes or subsidies, are highly motivated by warm-glow preferences. Although warm-glow is the dominating motivation in our study, it decreases with age and is even smaller for the parents. Another policy-relevant aspect of our study is how such heterogeneous altruistic motivations change when the recipient is from a conflict-based out-group. Given the widespread rhetoric that heterogeneous societies can negatively impact access to public and/or common goods, we do not observe a similar pattern in our sample in the domain of voluntary or charitable donations. Warm-glow, which is also the dominating motive to give among children, is not impacted by the religious identity of the recipient.

From a policy perspective, it is evident that if charitable giving and contributions to public goods have to be encouraged, appealing to the warm-glow sentiments of donors is recommended. Although the average giving for warm-glow motivated donors is lower, the total contribution of individuals motivated by warm-glow is much larger than the contribution made by the minority donors driven by pure altruism. In our sample, we do not find warm-glow motivations to be stronger toward an in-group recipient. On the contrary, we find warm-glow motivations decreased when children viewed the NGO as favoring only their own religion and increased when they believed that charitable donations were a good deed and beneficial to the society.

### 3.8 Appendix A

TABLE 3.8: Balance Table - Children

	(1) Control	(2) Ingroup	(3) Outgroup	(4) (1) vs. (2), p-value	(5) (1) vs. (3), p-value	(6) (2) vs. (3), p-value
<b><i>Socio</i></b>						
<b><i>Demographics</i></b>						
Female	0.489	0.486	0.474	0.918	0.617	0.678
Age	12.002	11.892	11.842	0.317	0.160	0.635
AgeGroups	1.987	1.929	1.950	0.164	0.387	0.584
Hindu	0.517	0.498	0.553	0.498	0.226	0.049
Siblings	3.444	3.341	3.623	0.403	0.346	0.108
Distance to school	12.458	13.444	12.620	0.180	0.822	0.105
Nearest school	13.274	12.717	8.345	0.931	0.402	0.438
Cognition	3.486	3.403	3.431	0.384	0.565	0.771
Religiosity	3.738	3.799	3.586	0.606	0.237	0.053
Flyer	3.460	3.545	3.426	0.388	0.752	0.236
<b><i>PostExperiment</i></b>						
<b><i>Survey</i></b>						
Expectation	21.133	21.835	21.234	0.389	0.904	0.432
Familiar NGO	0.437	0.506	0.518	0.062	0.030	0.722
Charity is beneficial	0.855	0.920	0.857	0.005	0.956	0.003
NGOfavorsingroup	0.662	0.768	0.585	0.001	0.032	0.000
After subsidy	3.521	3.391	3.338	0.073	0.016	0.466
After tax	3.343	3.255	3.251	0.248	0.230	0.956
Follow social norm(Ingroup)	3.423	3.325	3.243	0.196	0.022	0.265
Reason to donate	2.038	1.970	2.110	0.019	0.033	0.000
<i>N</i>	547	647	626			

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

TABLE 3.9: Frequency Table

	Control		Hindu		Muslim		Total	
	No.	%	No.	%	No.	%	No.	%
<b>Class</b>								
4	57	7.5	85	10.6	79	9.7	221	9.3
5	159	20.9	181	22.6	163	19.9	503	21.1
6	69	9.1	23	2.9	65	7.9	157	6.6
7	141	18.5	269	33.6	239	29.2	649	27.3
8	118	15.5	63	7.9	81	9.9	262	11.0
9	177	23.3	113	14.1	154	18.8	444	18.7
10	40	5.3	66	8.3	37	4.5	143	6.0
<b>Total</b>	761	100.0	800	100.0	818	100.0	2,379	100.0
<b>Father Work</b>								
Job	315	41.4	298	37.3	375	45.8	988	41.5
Daily wage	174	22.9	211	26.4	178	21.8	563	23.7
Small Business	136	17.9	137	17.1	125	15.3	398	16.7
Big Business	53	7.0	62	7.8	71	8.7	186	7.8
At home	19	2.5	19	2.4	22	2.7	60	2.5
Missing	64	8.4	73	9.1	47	5.7	184	7.7
<b>Total</b>	761	100.0	800	100.0	818	100.0	2,379	100.0
<b>Mother Work</b>								
Job	52	6.8	61	7.6	67	8.2	180	7.6
Daily wage	64	8.4	60	7.5	61	7.5	185	7.8
Small Business	23	3.0	39	4.9	33	4.0	95	4.0
Big Business	6	0.8	8	1.0	9	1.1	23	1.0
At home	549	72.1	555	69.4	600	73.3	1,704	71.6
Missing	67	8.8	77	9.6	48	5.9	192	8.1
<b>Total</b>	761	100.0	800	100.0	818	100.0	2,379	100.0
<b>Travel to school</b>								
Walk	502	66.0	536	67.0	590	72.1	1,628	68.4
Cycle	17	2.2	23	2.9	12	1.5	52	2.2
Auto	15	2.0	17	2.1	15	1.8	47	2.0
School Bus	70	9.2	60	7.5	61	7.5	191	8.0
Public Bus	36	4.7	35	4.4	39	4.8	110	4.6
Van	33	4.3	39	4.9	30	3.7	102	4.3
Train	5	0.7	9	1.1	7	0.9	21	0.9
Taxi	2	0.3	1	0.1	2	0.2	5	0.2
Motor Bike	21	2.8	22	2.8	16	2.0	59	2.5
Private bus	0	0.0	0	0.0	1	0.1	1	0.0
Car	2	0.3	1	0.1	3	0.4	6	0.3
Missing	58	7.6	57	7.1	42	5.1	157	6.6
<b>Total</b>	761	100.0	800	100.0	818	100.0	2,379	100.0

TABLE 3.10: Balance Table - Parents

	(1) Control	(2) Ingroup	(3) Outgroup	(4) (1) vs. (2), p-value	(5) (1) vs. (3), p-value	(6) (2) vs. (3), p-value
<b><i>Father</i></b>						
Monthly Income	12875.629	13763.446	14348.840	0.119	0.018	0.371
Years Education	8.674	8.780	8.845	0.634	0.445	0.764
Religiosity	4.140	4.098	4.175	0.444	0.533	0.134
Experience discrimin	0.203	0.217	0.220	0.666	0.584	0.917
Recent charity	0.881	0.910	0.886	0.285	0.842	0.325
Discuss charity	0.161	0.224	0.197	0.039	0.222	0.350
Risk seeking	0.727	0.695	0.681	0.223	0.091	0.614
Impatient	0.792	0.794	0.763	0.941	0.235	0.188
All equal education	0.269	0.281	0.325	0.653	0.041	0.093
All equal work	0.349	0.331	0.382	0.520	0.251	0.062
Respect all	0.403	0.348	0.447	0.059	0.140	0.000
Minority discrimin work	0.575	0.607	0.627	0.265	0.078	0.489
Minority discrimin edu	0.499	0.540	0.562	0.172	0.036	0.437
<b><i>Mother</i></b>						
Monthly Income	6697.312	7819.643	8460.507	0.223	0.104	0.539
Years Education	7.375	7.994	7.606	0.012	0.352	0.102
Religiosity	4.136	4.122	4.071	0.789	0.224	0.299
Experience discrimin	0.269	0.215	0.208	0.096	0.061	0.807
Recent charity	0.857	0.883	0.886	0.308	0.311	0.900
Discuss charity	0.217	0.198	0.200	0.558	0.613	0.931
Risk seeking	0.767	0.713	0.691	0.041	0.005	0.396
Impatient	0.816	0.807	0.768	0.715	0.050	0.092
All equal education	0.296	0.285	0.350	0.677	0.056	0.014
All equal work	0.376	0.339	0.395	0.187	0.522	0.040
Respect all	0.397	0.368	0.452	0.323	0.062	0.003
Minority discrimin edu	0.593	0.608	0.650	0.604	0.049	0.126
Minority discrimin work	0.496	0.557	0.585	0.042	0.003	0.319
<i>N</i>	547	647	626			

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

FIG. 3.4: Distribution under tax and subsidy - Children

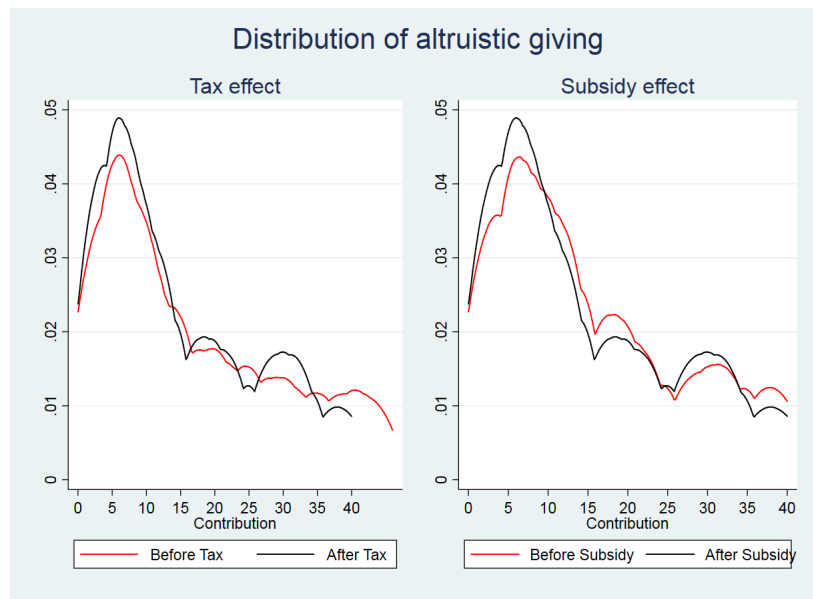


FIG. 3.5: Distribution under tax and subsidy - Parents

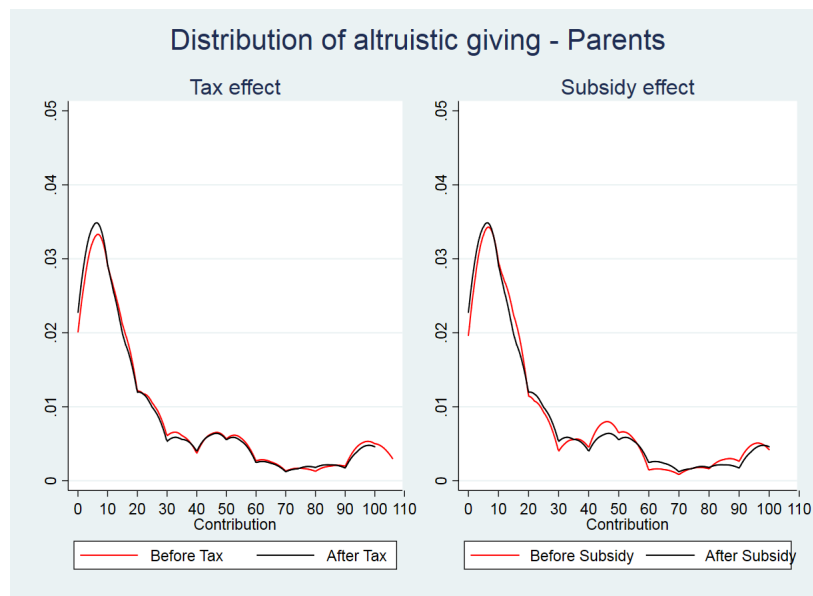


TABLE 3.11: Socialization and Peer effect

	1	2	3
	Peer expectations	Social norm in class	Social norms of ingroup
	b/se	b/se	b/se
7-9years $\times$ Control	-0.061*** (0.02)	0.512*** (0.10)	0.000 (.)
7-9years $\times$ Ingroup	-0.002 (0.00)	0.228** (0.09)	-0.018 (0.06)
7-9years $\times$ Outgroup	0.009 (0.01)	-0.006 (0.09)	-0.170 (0.09)
10-13years $\times$ Control	-0.011*** (0.00)	0.085** (0.03)	0.037 (0.03)
10-13years $\times$ Ingroup	0.004* (0.00)	0.078 (0.04)	0.027 (0.03)
10-13years $\times$ Outgroup	-0.001 (0.00)	0.074 (0.04)	0.039 (0.03)
14-17years $\times$ Control	0.038* (0.02)	-0.342*** (0.08)	0.000 (.)
14-17years $\times$ Ingroup	0.010** (0.00)	-0.071 (0.05)	0.073* (0.04)
14-17years $\times$ Outgroup	-0.011*** (0.00)	0.155*** (0.05)	0.248*** (0.07)
Observations	1326	1188	1182

TABLE 3.13: Impact of religiosity - Frequency of visiting religious shrine

	All	Hindus	Muslims
	b/se	b/se	b/se
7-9years $\times$ Control	0.243*** (0.07)	0.223*** (0.06)	0.000 (.)
7-9years $\times$ Ingroup	-0.068 (0.05)	-0.261*** (0.07)	0.186 (0.12)
7-9years $\times$ Outgroup	0.009 (0.04)	-0.055 (0.06)	0.147 (0.11)
10-13years $\times$ Control	0.130*** (0.02)	0.122*** (0.02)	-0.151 (0.08)
10-13years $\times$ Ingroup	-0.001 (0.02)	-0.046 (0.03)	-0.037 (0.03)
10-13years $\times$ Outgroup	-0.004 (0.01)	-0.023 (0.02)	0.017 (0.02)
14-17years $\times$ Control	0.016 (0.05)	0.020 (0.04)	0.000 (.)
14-17years $\times$ Ingroup	0.066** (0.02)	0.169*** (0.03)	-0.260* (0.10)
14-17years $\times$ Outgroup	-0.017 (0.02)	0.010 (0.04)	-0.114 (0.09)
Observations	1326	816	510



TABLE 3.15: Intergenerational Transmission - Parents opinions on Equal opportunity

	Subjective Opinions	Subjective Opinions
	Father b/se	Mother b/se
7-9years $\times$ Control	-0.298*** (0.05)	-0.128 (0.07)
7-9years $\times$ Ingroup	-0.112** (0.04)	-0.007 (0.05)
7-9years $\times$ Outgroup	0.265*** (0.05)	-0.023 (0.05)
10-13years $\times$ Control	-0.060** (0.02)	-0.019 (0.02)
10-13years $\times$ Ingroup	-0.012 (0.02)	-0.003 (0.02)
10-13years $\times$ Outgroup	0.121*** (0.02)	-0.023 (0.02)
14-17years $\times$ Control	0.179*** (0.04)	0.090 (0.06)
14-17years $\times$ Ingroup	0.089*** (0.03)	0.002 (0.03)
14-17years $\times$ Outgroup	-0.023 (0.03)	-0.023 (0.03)
Observations	1314	1302

TABLE 3.17: Intergenerational Transmission -Parent's past charity

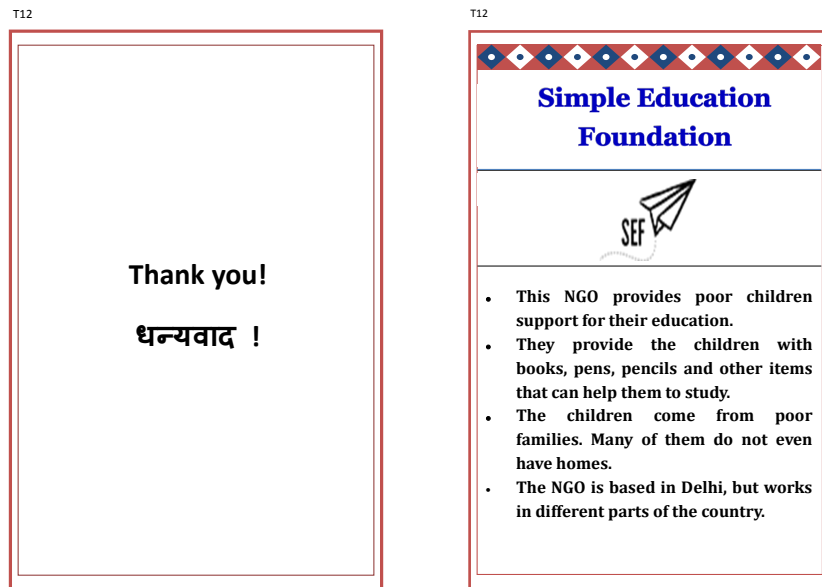
	Father		Mother	
	Past charity	Child knows	Past charity	Child knows
	b/se	b/se	b/se	b/se
7-9years $\times$ Control	0.000 (.)	0.063 (0.20)	0.000 (.)	0.000 (.)
7-9years $\times$ Ingroup	0.223 (0.16)	-0.140 (0.11)	0.184 (0.12)	-0.213 (0.12)
7-9years $\times$ Outgroup	0.791*** (0.23)	1.389*** (0.13)	0.510* (0.26)	0.334** (0.10)
10-13years $\times$ Control	0.183** (0.06)	-0.195** (0.06)	0.314*** (0.08)	-0.094 (0.07)
10-13years $\times$ Ingroup	-0.003 (0.06)	0.022 (0.04)	-0.087 (0.05)	-0.090* (0.05)
10-13years $\times$ Outgroup	0.399*** (0.11)	0.447*** (0.05)	0.105 (0.10)	0.045 (0.04)
14-17years $\times$ Control	0.000 (.)	-0.452** (0.16)	0.000 (.)	0.000 (.)
14-17years $\times$ Ingroup	-0.228* (0.11)	0.185* (0.07)	-0.357*** (0.07)	0.033 (0.07)
14-17years $\times$ Outgroup	0.007 (0.08)	-0.494*** (0.08)	-0.300* (0.15)	-0.245*** (0.06)
Observations	1326	1326	1326	1326

### 3.9 Appendix B

#### I. Treatment flyers

FIG. 3.6: Flyer-Hindu Identity treatment (English version)

(a) Pages 1 and 4



(b) Pages 2 and 3

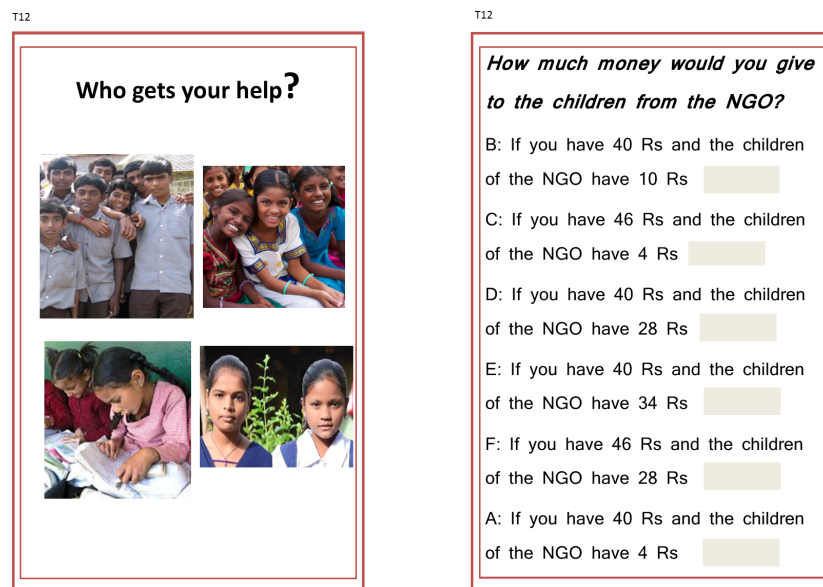


FIG. 3.7: Flyers-Abstract treatment

C1

**किसको मदत मिलेगा?**



C1

**संस्था के बच्चों को कितना देना चाहते हैं अगर,**

A: आपके पास 40रु है और बच्चों के पास 4रु है

B: आपके पास 40रु है और बच्चों के पास 10रु है

C: आपके पास 46रु है और बच्चों के पास 4रु है

D: आपके पास 40रु है और बच्चों के पास 28रु है

E: आपके पास 40रु है और बच्चों के पास 34रु है

F: आपके पास 46रु है और बच्चों के पास 28रु है

FIG. 3.8: Flyers-Identity treatment (Muslim children)

T22

**किसको मदत मिलेगा?**



T22

**संस्था के बच्चों को कितना देना चाहते हैं अगर,**

B: आपके पास 40रु है और बच्चों के पास 10रु है

C: आपके पास 46रु है और बच्चों के पास 4रु है

D: आपके पास 40रु है और बच्चों के पास 28रु है

E: आपके पास 40रु है और बच्चों के पास 34रु है

F: आपके पास 46रु है और बच्चों के पास 28रु है

A: आपके पास 40रु है और बच्चों के पास 4रु है

## II. Exit questionnaire

The enumerators randomly selected 50% of the students in the class and asked them questions regarding the pictures and the NGO mentioned in the flyer. In addition, they were also asked questions on their religiosity.

1. **Student ID:** \_\_\_\_\_
2. **School ID:** \_\_\_\_\_
3. **Your name:** \_\_\_\_\_
4. **Father's name:** \_\_\_\_\_
5. **Last name:** \_\_\_\_\_
6. **Have you heard of this NGO (show picture) before?**
  - ☐ Yes
  - ☐ No

Below are some statements. Please answer by selecting one of the following options:

7. **Giving some of your earned gift to this NGO will benefit the entire society.**
  - ☐ Yes
  - ☐ No
8. **After looking at these pictures, do you think the NGO will help only those children from your own religion?**
  - ☐ Yes
  - ☐ No
9. **You would give your gift to the children of this NGO because:** You can answer more than one option
  - ☐ They were children from your religion
  - ☐ They were poorer than you
  - ☐ They were poor and from your religion
  - ☐ They were poor but not from your religion
10. **If other children increased their giving to the poor children, what will you do?**
  - ☐ Follow what the other children did
  - ☐ I will give more
  - ☐ I will give less
  - ☐ I will give the same as before
  - ☐ I do not know
11. **If we reduce some money from your gift and give it directly to the children, what will you do?**
  - ☐ I will give more
  - ☐ I will give less
  - ☐ I will give the same as before

☐ I do not know

**12. If other children from your own religion increased their giving to the poor children, what will you do?**

☐ I will give more

☐ I will give less

☐ I will give the same as before

☐ I do not know

**13. Expectation: How much do you think the other children in your class gave to the children of this NGO? State a number.**

Minimum: \_\_\_\_\_

**14. Which of the following religious places do you frequently visit?**

☐ Temple

☐ Mosque

☐ Church

☐ None [End the questionnaire]

☐ Others: \_\_\_\_\_

**15. How often do you visit this religious place**

☐ Everyday

☐ Once a week

☐ Few times in one month

☐ Once in 6 months

☐ Once a year

☐ Never

### III. Parents survey

Both mothers and fathers of the respondents were asked a few questions over a telephonic conversation. At the end of the survey, they played a dictator game and received some money in the form of telephone recharge. Both the survey questions and the dictator game is explained below.

To the parents: *I am a researcher conducting research on schooling in Mumbai. We had recently visited your child [name of child] in their school. We would also like to ask you few questions. The questions relate to your household situation and your opinions regarding the society. We would be grateful if can respond to these questions. I would like to tell you that this information will be treated with complete confidentiality and never disclose your views.*

**16. Are you willing to answer the questions that I will be asking you? You can withdraw your consent in case you do not wish to answer any of the questions at anytime of this survey.**

☐ Yes [Continue to next question]

☐ No [End survey]

## Opportunities 1

**17. All religious groups and caste groups should have equal chances to get a good education in this country.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

**18. Women should have the same rights as men in every way.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

**19. All religious and caste groups should have equal chances to get good Jobs in this country.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

**20. Schools should teach students to respect members of all religious groups.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

**21. When Jobs are scarce, men have more right to a job than women.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

## Opportunities 2

**22. Children who are members of certain minority religious and caste groups have fewer chances than other children to get a good education in this country.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

**23. Girls have fewer chances than boys to get a good education in this country.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

**24. Adults who are members of certain minority religious and caste groups have fewer chances than others to get better jobs in this country.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

**25. Women have fewer chances than men to get Jobs in this country.**

☐ Strongly disagree      ☐ Disagree      ☐ Agree      ☐ Strongly agree

**26. Have you faced discrimination from people of other religions?**

☐ Yes

☐ No

**27. In the last 6 months, have you donated anything for charity or to poor people?**

☐ Yes

☐ No [Skip to 26]

**28. Do your children know about this?**

☐ Yes

☐ No

**29. Do you speak to your children about charity and donations?**

☐ Yes

☐ No

**Socio-Economic details**

30. Complete name: \_\_\_\_\_

31. What is the name of your child?: \_\_\_\_\_

32. What is your relationship with the child?

☐ Mother      ☐ Father      ☐ Guardian

33. What is your total monthly income? (in Rs.): \_\_\_\_\_

34. We would like to know something about the organizations in which you participate. Here is a list of several organizations. Please indicate if you are a member or not, if you are an active or non active member (Mark only one answer per line)

	I am not a member	I am an active member	I am a member but not active
Political party			
Religious organization			
Housing society			
Workers union			
Others _____			



## Chapter 4

# Highly Mentally Occupied to Harm Others: An Experimental Joy-of-Destruction Game under Cognitive Load with Children in Colombia

### 4.1 Introduction

Juvenile delinquency not only has negative economic consequences but it also affects social outcomes. Recent studies show that the likelihood of academic failure and unhealthy peer social relations is higher for antisocial children. Moreover, individuals who exhibit antisocial behavior during their childhood tend to become adults who incur major problems, for instance, drug abuse, chronic unemployment, cause of car accidents, among others ([Dishion and Patterson, 2015](#); [Jolliffe et al., 2017](#); [Patterson et al., 1990](#); [Reid and Patterson, 1989](#)). Therefore, understand which factors encourage prosocial behavior and which ones lessen antisocial behavior from a behavioral and economic perspective is crucial, especially for individuals who are reaching the age of criminal responsibility.<sup>1</sup>

Recent studies have found that living in poverty causes a decrease of cognitive function on adult populations ([Mani et al., 2013](#)). Therefore, this reduction of cognitive bandwidth implies that people with financial problems could potentially be taking economic decisions with fewer cognitive resources available. For instance, individuals might base their decisions mainly on shortcuts, heuristics, and intuition. In this paper, I study how the economic decisions of 12-year-old children from middle- and low-income families are affected by having fewer cognitive resources available, focusing on anti-social preferences such as the destruction of others' material payoff.

The dual-system framework is used to model individuals' decision-making processes. Under

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<sup>1</sup>The average age of criminal responsibility is 13.5 across countries ([Hazel \(2008\)](#): "Cross-national comparison of youth justice").

this framework, decisions are based on an intuitive and automatic system, called System 1, and on a more deliberate and controlled system, known as System 2 (Evans, 2003; Haidt, 2001; Kahneman, 2011). Recent studies found that intuition encourages cooperation and generosity among individuals, and that reflection undermines an individual's cooperation impulses (using a memory task in Schulz et al. (2014); framing method in Zhong (2011); time pressure in Rand et al. (2012); see a critical review about Rand's findings in Tinghög et al. (2013)). On the other hand, other studies show that dishonest behavior can be diminished if people have enough time and there is no justification for behaving dishonestly (Shalvi et al., 2012; Van 't Veer et al., 2013).

Humans are not completely self-interested, in fact, in some circumstances they exhibit prosocial behavior toward other individuals. For instance, they reciprocate people's prosocial behavior (Fehr and Schmidt, 1999; Berg et al., 1995), reject unfair offers in ultimatum games (Gürth et al., 1982), punish free-riders in public good games (Fehr and Gächter, 2000), and split their endowment with others in dictator games (Forsythe et al., 1994; Hoffman et al., 1994). In other circumstances people may act anti-socially, which can negatively affect economic trade, cooperation, and development (Prediger et al., 2014). In previous studies that investigated spitefulness, defined as the willingness to reduce others' material payoff, it was found that people from high castes have a stronger willingness to reduce the endowment of others compared to people belonging to lower castes, which can be explained by the impact of caste culture (Fehr et al., 2008). Other experiments found that individuals punish people who behave prosocially in public good games (Herrmann et al., 2008), are also willing to burn other people's money in order to achieve either more equality or to be ahead (Zizzo, 2003), and they play nasty even without any strategic reasons, in other words they do it 'just for pleasure' (Abbink and Sadrieh, 2009).

I implement a lab-in-the-field economic experiment with 12-year-old school children in Bogota, Colombia. Prior to the main game, children answer a short version of the Raven's Standard Progressive Matrices which measures individuals' cognitive ability. Subsequently, to elicit a baseline prosocial behavior, participants played a two-person dictator game (DG), followed by a modified joy-of-destruction game (JoD) under different levels of cognitive load without destruction costs (Abbink and Sadrieh, 2009; Zizzo, 2003). To investigate whether antisocial behavior is an automatic or deliberate action, I implement a between-subjects analysis with different treatments where individuals' cognitive load varies through a memory task in the JoD game. This design identifies the effect individual cognitive load on the propensity and intensity of harming others.

I found that in the JoD game, on average across treatments, 51.3 percent of the children decided to destroy part of their partner's income. The likelihood of destroying their partner's endowment decreases when the cognitive bandwidth is taxed. Moreover, the proportion of income destroyed also decreases when cognitive load increases. On average, children overestimate the expected destruction of their partners. Additionally, antisocial behavior during the game is positively correlated with a higher score in the psychological test Cognitive Reflection Test (CRT), and with a positive score from the Teenage Inventory of Social Skills Items (TISSI). In conclusion, although the opportunity of harming others is given, only half of them decided to

engage in this behavior, and when they were giving the opportunity to perform an alternative activity, in this case a memory task, the intensity of harming others decreased. Thus, the availability of alternative activities could help to diminish antisocial behavior in children.

The contribution of this study to the literature on antisocial behavior is twofold. First, it explores the correlation between cognitive load and the propensity of harming others in preadolescent children, which enriches the existing studies in adults and college students. Second, it contributes to broaden the understanding of economic behavior in children in two different context; a prosocial environment, i.e., sharing with others, and an antisocial environment where they could reduce others' endowment. In general, I found that children exhibit mixed preferences and they behave kindly or nastily toward their partners depending on the context.

## 4.2 Related Literature and Behavioral Predictions

Since the early 2000s, economic games have been implemented to elicit antisocial behavior. [Zizzo and Oswald \(2001\)](#) implemented a lab experiment where participants could burn others' money directly, and found in fact that individuals are willing to pay to burn others' endowment. They define this behavior as 'negative interdependent preferences' and argue that envy or concerns for fairness could be the reasons for this behavior. A follow-up study by [Zizzo \(2003\)](#) found that half of individuals were willing to reduce others' endowment and two thirds of them were rank egalitarian. [Abbink and Sadrieh \(2009\)](#) found that 40 percent of individuals of their sample decided to burn other's money when there was no fear of retaliation. Furthermore, [Abbink and Herrmann \(2011\)](#) implemented mini-JoD games with open and hidden treatments where, in the hidden treatment, destruction was hidden by a random shock – and destruction was higher in that treatment, even in the presence of destruction costs. Therefore, antisocial behavior implies a moral cost.

Other group of studies look at prosocial and antisocial behavior among individuals and within experimental games ([Fehr and Gächter, 2002](#); [Herrmann et al., 2008](#); [Espín et al., 2012](#); [Kimbrough and Reiss, 2012](#); [Brañas-Garza et al., 2014](#)). For instance, [Sadrieh and Schröder \(2017\)](#) found that helping and harming are highly correlated. Furthermore, [Sadrieh and Schröder \(2012\)](#) found that pro- and antisocial preferences are independent of payoffs, and they denominated this behavior as the 'desire to influence others,' and when full information and experimental demand increase, pro-social behavior increases. Similar results were found by [Zizzo and Fleming \(2011\)](#), who find that giving and destroying are positively correlated with social pressure. Antisocial behavior is rationalized by envy, spitefulness, and a preference for being ahead and gaining a relative standing ([Jensen, 2010](#); [Van Lange, 1999](#); [Kirchsteiger, 1994](#)).

Research on children's behavior using economic games, especially dictator games, have found that as children grow older they become more prosocial ([Fehr et al., 2013](#)), age is positively correlated with egalitarian distributions ([Fehr et al., 2008](#)), inequality aversion ([Cappelen et al., 2016](#); [Sutter et al., 2018](#)), less selfish behavior ([Maggian and Villeval, 2016](#); [Fehr et al., 2013](#)), and less envious ([Fehr et al., 2013](#)). Similarly, using ultimatum games, in some settings, younger children offer more and accept unfair proposals ([Murnighan and Saxon, 1998](#); [Castelli et al., 2010](#)), and in other studies older children give more and are more consistent with their proposals

(Harbaugh et al., 2003a, 2007). But, in general children are aware of the fairness and reject half of unfair proposals (Sutter and Kocher, 2007).

Under the framework of the dual-process theory, decision-making processes are based on the interaction of a fast and intuitive response, known as System 1, and a slower but more reflective System 2 (Kahneman, 2011; Evans and Stanovich, 2013; Evans, 2003). Under this framework, recent studies have focused on whether individuals' prosocial (selfish) behavior is intuitive or deliberate. Some theories argue that self-interest behavior is automatic while prosocial behavior is a more conscious process (Moore and Loewenstein, 2004; Zaki and Mitchell, 2013), and are supported by empirical evidence. For instance, Rand et al. (2012) implemented a series of experiments with 212 participants around the world through Amazon Mechanical Turk and found that contributions increase when individuals have a limited time to decide, which implies that prosocial behavior is more spontaneous. Shalvi et al. (2012) found that dishonest behavior diminishes when individuals have enough time and there is no self-serving justification for dishonest behavior. On the other hand, lying requires high cognitive resources, even when lying could increase own profit (Verschuere et al., 2018; Van 't Veer et al., 2013). In line with the literature that investigates whether automatic responses are prosocial or self-interested, this study focuses on researching whether antisocial behavior is an intuitive or deliberate process. I explore to what extent adolescents decide to reduce others' material payoffs while they have fewer cognitive resources available, i.e., when their decisions are mostly based on their System 1.

Based on the behavioral models by Loewenstein and O'Donoghue (2011) and Sadrieh and Schröder (2016), we expect that individuals who have materialistic/altruistic preferences will not be engaged in antisocial behavior to reduce the material payoffs of their partners in any context, even in the presence of cognitive load. On the other hand, when children have joy-of-destruction preferences, we expect that they decide to reduce part of the material payoff of their partner. Lastly, given that the empirical evidence supports that automatic responses are based on self-interest, we expect that under cognitive load, individuals behave in a more self-interested fashion, which implies less antisocial/prosocial decisions should be observed.<sup>2</sup>

## 4.3 Experimental Design and Procedures

### 4.3.1 Experimental Procedures

From August to November 2017, 882 school children in the 6th and 7th grades (12 to 14-years-olds) participated in this study. We contact five middle- and low-income schools located in Bogota; one private school and four public schools.<sup>3</sup> I implemented a computerized lab-in-the-field economic experiment on tablets using the open-source software *oTree* (Chen et al., 2016a).

The implementation of this project received approval from the principals in each school. Additionally, parents received a written consent form from us. We briefed them on the aim of this study and the children's voluntary participation in the activities.<sup>4</sup> All sessions were

<sup>2</sup>Theoretical models are described in detail in Appendix

<sup>3</sup>Before the main data collection began, pilot sessions were run in one private school. The objective of these sessions was to test the software and to audit whether all procedures were well defined. Data from these sessions are excluded from the final analysis.

<sup>4</sup>Although parents could prevent a child's participation, we did not receive any refusals.

scheduled and were run during regular school hours, and teachers were informed in advanced about the activities.

Children participated in one session that lasted an hour, which includes a pre-experimental questionnaire, the implementation of economic games, and an additional questionnaire at the end. In each session one coordinator read out loud the standardized instructions depending on the treatment, i.e., everyone received the same information, so that the comparison between groups is feasible.<sup>5</sup> During the sessions, students were not allowed to communicate with each other, but they could ask questions if they had any doubts about the tasks' execution. Moreover, the children were informed that their participation was voluntary and they could leave the session at any moment. Children's decisions in the game, and the information collected, were managed anonymously throughout and after the session. At the end of each sessions, the children received vouchers equivalent to their payment in the game plus their participation fees. These vouchers<sup>6</sup> could only be redeemed at the school stores.

### 4.3.2 Experimental Design

In each session, participants were asked to answer a pre-experimental questionnaire, subsequently they played two different two-person games with different partners, and the composition of these groups remained anonymous the whole time,<sup>7</sup> namely a dictator game (DG) and a modified joy-of-destruction game (JoD). At the end of the second game, they answered a post-experimental questionnaire. Lastly, although participants played two games, only one game was randomly selected for payments and the students were given a participation fee of 1,000COP (US\$0.32).<sup>8</sup>

At the beginning of each game, participants completed a computerized real effort task and received an initial endowment (Gill and Prowse, 2013, 2012). On the screen of each tablet, 10 slider bars, which were initially placed at '0,' were displayed; the task for participants was to move each bar exactly to the 50 mark (the middle) within 90 seconds. The design of this task avoids initial income inequalities and the house money effect, thus children could complete the task within the available time (Thaler and Johnson, 1990; Cherry et al., 2002, 2005).

In the dictator game, participants receive 10,000COP (US\$3.46) for the real effort task and had to decide how much of their endowment they wanted to transfer to their partner. Although all players decided as dictators, i.e., each player chose whether to share this endowment with their partner who would not receive any endowment, only one participant was randomly selected and their decisions were implemented when this game was selected for payments. The results of this game is used to elicit a baseline prosocial behavior in the main analysis, i.e., decisions in this game represented a baseline level of children's altruism.<sup>9</sup>

The second game was a two-person one-shot modified version of the joy-of-destruction game

<sup>5</sup>The composition of our research assistants team, who helped during the sessions, remained the same throughout the whole data collection period.

<sup>6</sup>Children did not receive cash at any time.

<sup>7</sup>Children were informed that they would be matched before each game with a randomly selected anonymous partner in the room.

<sup>8</sup><https://www.xe.com/>

<sup>9</sup>Sadrieh and Schröder (2016) found that one third of their sample exhibited mixed social preferences, and giving and destroying were positively correlated. For this reason, elicitation of prosocial behavior would help to identify whether children behaved similarly to other populations.

based on that of the experiment by [Abbink and Sadrieh \(2009\)](#). In the design, children play this game with a cognitive load component. After completing the real effort task, both participants received an initial endowment of 15,000COP (US\$5.20) each. In this game, participants were given the opportunity to destroy part of their partner’s endowment if they wanted to, a non-destruction option was also given. In this design, destruction has no cost and participants cannot retaliate or have future interactions. Therefore, either pure spite or nastiness are assumed to be the main motives for destroying others’ endowment. Along with the destruction decision, participants were asked to do a memory task testing their recall, thereby imposing a tax on their cognitive bandwidth (see [Deck and Jahedi \(2015\)](#), for a review of this methodology). Although both participants decided on the amount of the other’s endowment they wanted to destroy, only one participant per group was randomly selected and their decisions were implemented.

In order to analyze the effect of cognitive load on antisocial behavior, I implement a between-subject experimental design where participants were asked to memorize a set of ordered colors while they decide in the JoD game. In total, the experimental design consisted of a baseline treatment and two additional treatments. In the baseline treatment (labeled as *T0: no load*), participants made their decision without any memory task to execute. In other treatment (denoted as *T1: low load*), a low cognitive load was induced, i.e., participants had 1 minute to memorize a set of three different colors and, subsequently, they had to recall after they had made decisions in the JoD game. The final treatment (labeled as *T2: high load*) is similar to *T1*, but instead of memorizing three colors, players had to memorize and recall six colors. In this case, participants faced a higher cognitive load compared to *T0* and *T1*. In both treatments with cognitive load, *T1* and *T2*, before participants decided how much of their partner’s endowment they wanted to destroy, they were told that on the screen they would see a series of colors that they have to memorize and recall at the end of the game. They were also informed that if they could correctly recall the series of colors, they would accumulate 1,000 COP (US\$0.32 USD) to their payments in that game.<sup>10</sup> Treatment assignment was made at the classroom level and participants were assigned to only one treatment.

### 4.3.3 Additional Data

At the beginning of each session, before children play the DG and JoD games, we collect information about children’s cognitive abilities. They were asked to complete a set of 10 Raven’s Standard Progressive Matrices (SPM) which garner a measure of children’s cognitive ability, namely fluid intelligence ([Styles and Raven, 1998](#)). People with higher reasoning ability are able to solve more complex problems, and when facing economic decisions they are likely to be more risk-averse and impatient ([Dohmen et al., 2010](#)). In this paper, I estimate the correlation between cognitive ability and antisocial behavior for this sample.

In recent studies, risk-seeking behavior is correlated with a higher likelihood of committing criminal acts. Therefore, after completing the economic games, I elicit children’s risk preferences using a set of lotteries based on [Binswanger \(1980\)](#) and [Eckel and Grossman \(2002\)](#). This methodology assumed a functional form of the utility function, as a result, it is possible to measure the level of risk aversion, although one cannot differentiate between risk-neutral and

<sup>10</sup>Incorrect recalls were not punished with a decrease in payments.



risk-seeking individuals. Participants have to choose one out of six lotteries to play. Each lottery has two payoffs, and the probability of choosing either payoff is 50 percent (see a descriptive screenshot of this set in Appendix).

Antisocial behavior is also related to individual's lack of self-control (Friehe and Schildberg-Hörisch, 2017). Hence, after eliciting risk preferences, individuals' impulsiveness is elicited implementing a version of the cognitive reflection test (CRT) (Frederick, 2005; Thomson and Oppenheimer, 2016). This methodology is used to measure one type of cognitive ability, namely executive control (or impulsiveness). Participants are asked to answer four CRT questions and one decoy question (see Appendix). These questions are designed such that the intuitive answers are normally wrong, and respondents should reflect more to get the correct answer. Although these questions are not monetarily incentivized, these questions were presented as riddles, and participants were challenged to solve them.

The correlation between decisions in the experiment and behavior outside supports the external validity of the study. Therefore, after the CRT questions, children were requested to report their social skills by answering a psychological test called Teenage Inventory of Social Skills (TISSI) (Inderbitzen and Foster, 1992). This test is a self-reported questionnaire that aims at assessing adolescents' social competence. Each item describes a social situation and respondents have to say on a six-point Likert scale how well that situation described them. This test originally had 40 items, however, due to time limitations, a short version with five positive and five negative items was implemented (see Appendix).

Lastly, before we finish the session, children filled out a post-experiment questionnaire that collects children's socio-demographic information. This information is anonymously analyzed and is used to evaluate potential mechanisms.

## 4.4 Data and Results

### 4.4.1 Summary Statistics and Non-Parametric Tests

#### Sample

In this study a total of 882 school children participated in the experimental sessions. Table 4.3 displays the summary statistics of this sample organized according to sociodemographic characteristics, decisions on the game, and supplementary outcomes. In this sample, the children's average age is 12.5 and girls represent 47.93 percent of participants. They receive 5,900COP as pocket money per week and 20 percent of them worked in the last month.

The mean household has between five and six members (sd: 3.74), children have two siblings on average (sd: 1.81), and in 60 percent of households both parents live together. Parents are relatively young and most of them have a job; fathers are 43 years old on average (sd: 8.36) and 97 percent have a job, and mothers are 38.6 years old (sd: 7.01) and 83 percent are working mothers. One third of households, 36 percent (sd: 48), have experienced a difficult economic situation in the last month, e.g., unemployment of any parent, insufficient economic resources to buy basic goods (see Table 4.3).

According to the post-experimental questionnaire, 92 percent of children had not participated

in similar activities before. Most of the children understood the rules very well (83 percent), and all of them found the tasks of the game easy to complete. They could correctly answer 4.74 (sd: 2.12) out of eight raven's matrices, and impulsively answered 2.42 (sd: 0.96) out of four questions in the Cognitive Reflection Test (CRT).

### Destruction decisions under cognitive load

Treatment assignment is randomized at the classroom level. There is no evidence of statistically significant differences across treatments among observed sociodemographic variables, except for the CRT test and the Raven's Matrices results (see Table 4.5).

To evaluate whether cognitive load affects antisocial behavior, a first approach is to examine the main outcomes per treatment in the JoD game that are displayed in Table 4.1. Overall, 51.3 percent of the children decided to destroy part of their partner's income. However, the proportion of children in across treatments varied (T0 no load: 59.9 percent; T1 low: 50.43 percent; T2 high: 43.79 percent).<sup>11</sup> There is evidence that antisocial behavior is less frequent when children have fewer cognitive resources available, i.e., antisocial behavior should be a more reflective action.

TABLE 4.1: JoD Summary

	(1) T0: no load	(2) T1: low load	(3) T2: high load	(4) Overall	(5) p-value from joint orthogonality test
Decision of reducing	0.599 (0.035)	0.516 (0.028)	0.466 (0.026)	0.514 (0.017)	0.011
Proportion of income destroyed	0.191 (0.017)	0.151 (0.012)	0.143 (0.010)	0.157 (0.007)	0.034
Expected prop.of income reduced	0.270 (0.016)	0.270 (0.013)	0.257 (0.012)	0.265 (0.008)	0.725
<i>N</i>	197	316	369	882	
Proportion	0.223	0.358	0.418	1.000	

Note: Mean values of outcomes in the game. Standard errors in parentheses.

Figure 4.1 displays the proportion of children that decided to destroy their partner's endowment and the amount destroyed. In the intensive margin of antisocial behavior, the proportion of income destroyed in the baseline treatment (T0:  $m = 0.191$  percent,  $sd = 0.241$ ) is higher compared to the low-load treatment (T1:  $m = 0.147$ ,  $sd = 0.210$ ) to the high-load treatment (T2:  $m = 0.135$ ,  $sd = 0.196$ )<sup>12</sup>.

<sup>11</sup>Pearson's Chi-squared tests that the proportion of children who destroyed across treatments are equal:  
(1)  $H_0: T_0 = T_1$ ;  $\chi^2(1) = 0.089$ ,  $p = 0.766$  and (2)  $H_0: T_0 = T_2$ ;  $\chi^2(1) = 0.031$ ,  $p = 0.860$

<sup>12</sup>Mann-Whitney test for the proportion destroyed:  
(1)  $H_0: T_0 = T_1$ ;  $z = 2.132$ ,  $p = 0.033$  and (2)  $H_0: T_0 = T_2$ ;  $z = 3.689$ ,  $p = 0.000$



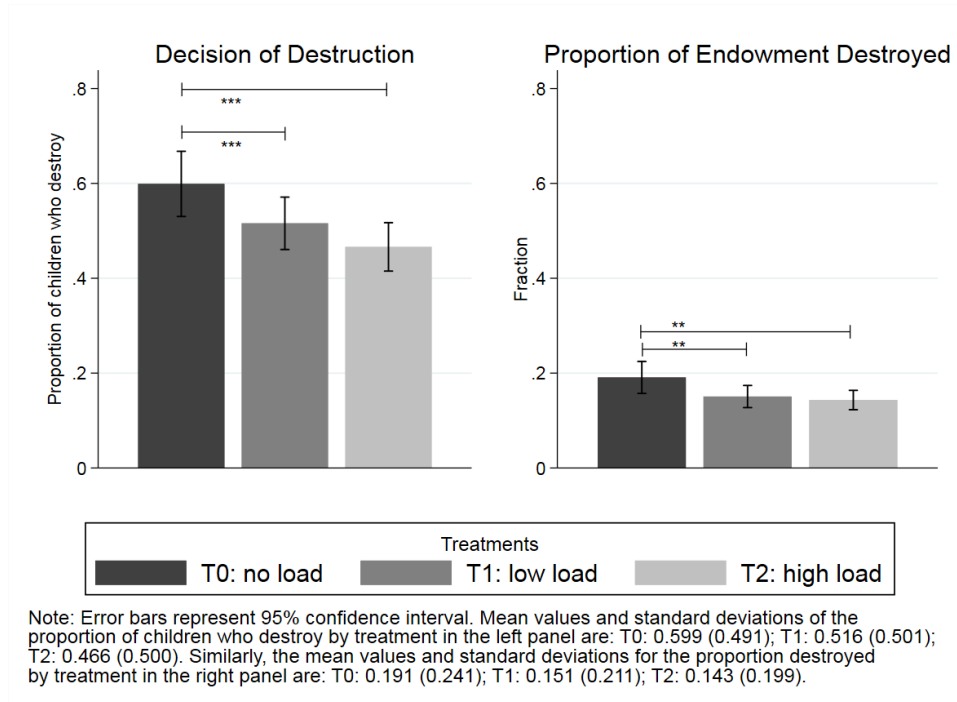


FIG. 4.1: Average results in the JoD game.

Among those children who decided to destroy, there is no evidence that the proportion of endowment destroyed varies across treatments (see Figure 4.5 in the Appendix). In conclusion, the probability of destruction decreases when cognitive load increases, but the amount destroyed for those who decide to reduce is similar across treatments.<sup>13</sup>

Comparing decisions among girls and boys, girls do not change the proportion of endowment destroyed across treatments (see Figure 4.3). Furthermore, the proportion of endowment destroyed among those who decided to destroy decreases when cognitive load increases but only for boys (see Figure 4.6 in the Appendix). In conclusion, boys are more likely to reduce antisocial behavior when their cognitive resources are taxed.

### Giving decisions

In the dictator game, 87 percent of children decide to share their endowment with their partner. The average amount shared is 3,445.58 COP (34.5 percent of their endowment;  $sd = 0.201$ ). Participants overestimate what their partner transfers ( $m = 3,977.37$  COP,  $sd = 2,113.61$ )<sup>14</sup> (see Table 4.9).

Although the proportion of boys (89.68%) that transferred a positive amount in the dictator game is statistically higher than the proportion of girls (83.93%),<sup>15</sup> there are no differences in the amount of endowment given by girls ( $m = 3\,335.52$  COP,  $sd = 2\,038.94$ ) compared to boys ( $m = 3\,529.03$  COP,  $sd = 1\,978.25$ )<sup>16</sup>; see Figure 4.11 in the Appendix). Last, interestingly, more than one third of children, 37.4 percent, shared exactly 50 percent of their endowment,

<sup>13</sup>  $T0$  vs.  $T1$ :  $z = 1.169$ ,  $p = 0.2425$ ;  $T0$  vs.  $T2$ :  $z = 1.033$ ,  $p = 0.3016$

<sup>14</sup> Compared with actual transfers this amounts are statistically different: t-test,  $t = -5.920$ ,  $p = 0.000$

<sup>15</sup> Pearson's Chi-squared tests:  $\chi^2(1) = 6.398$ ,  $p = 0.011$

<sup>16</sup> Mann-Whitney test  $z = 1.238$ ,  $p = 0.216$

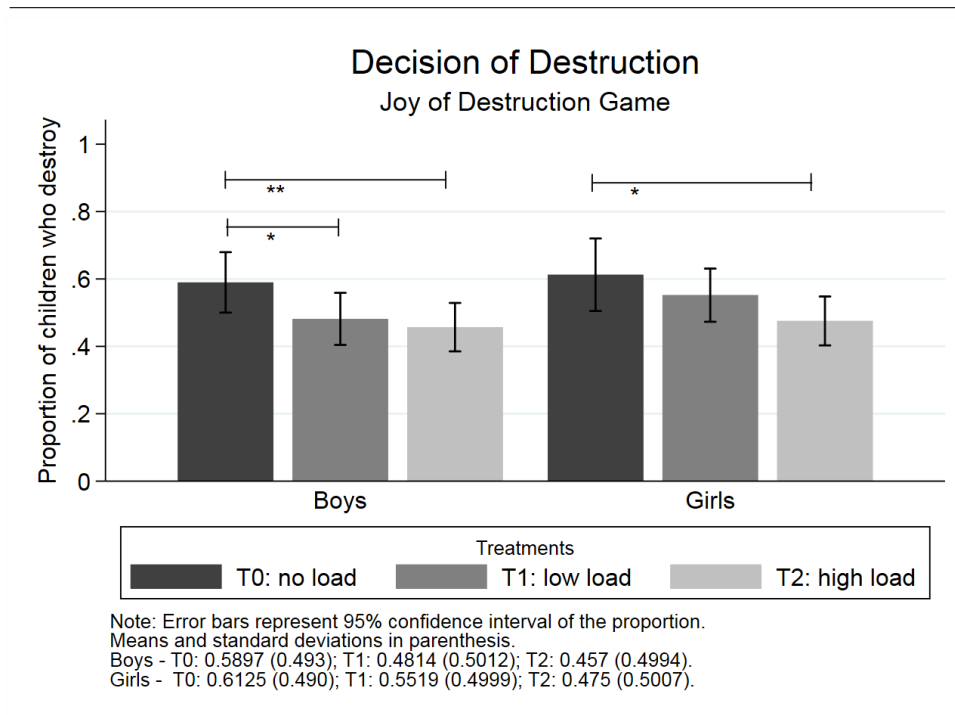


FIG. 4.2: Proportion of children who destroy another's endowment by treatment and gender.

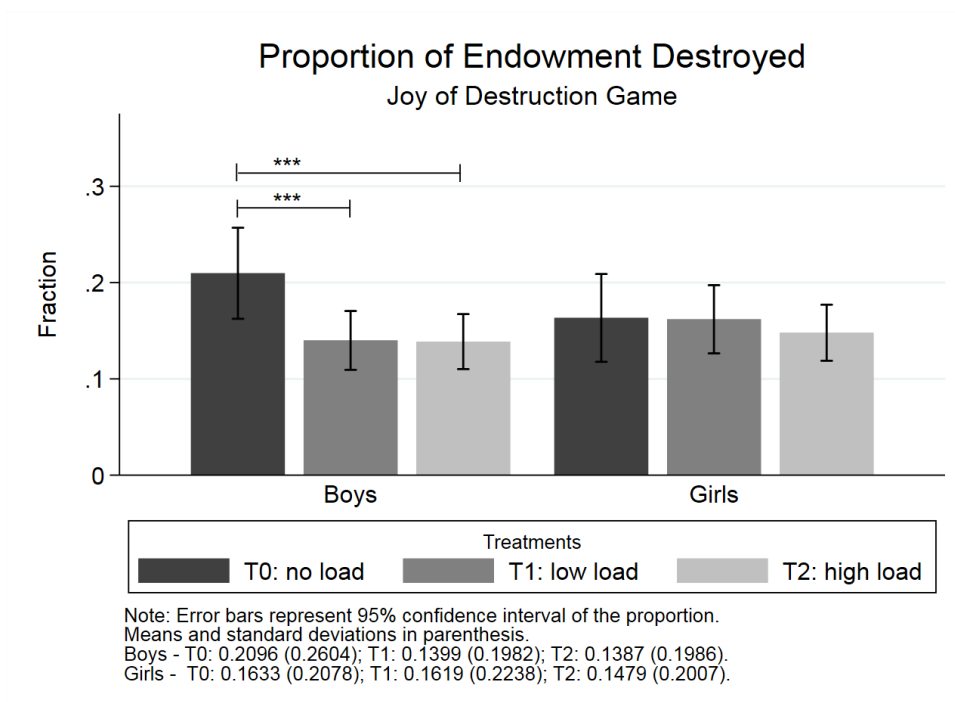


FIG. 4.3: Proportion of others' endowment destroyed.

10.8 percent did not share anything, and only 4.9 percent shared more than 50 percent of their endowment (see distribution in Figure 4.9 in Appendix).

Most of the children behaved prosocially in this game, compared to other studies on adults, children at this age are similar to adults in other settings.

### Consistency of prosocial and antisocial behavior

Since in this study participants take decisions in a DG and a JoD game, a within-subjects comparison is possible to implement. Following the behavioral classification of [Sadrieh and Schröder \(2016\)](#), we can identify four different behavioral types according to children's behavior as follows,

**Type 0 (Individualistic):** individuals with this type of behavior do not share their endowment in the DG and they do not destroy in the JoD game. In our sample, 51 individuals (5.78%) exhibit this behavioral type.

**Type 1 (Pure prosocial):** pure prosocial children give a positive amount in the DG but do not destroy in the JoD game. Around 338 individuals (38.32%) can be classified as this type.

**Type 2 (Mixed preferences):** participants who give a positive amount in the DG and at the same time destroy in the JoD game exhibit mixed preferences. Most of the children in our sample exhibit this behavioral type, in total, 448 individuals (50.79%).

**Type 3 (Pure antisocial):** pure antisocial individuals do not give in the DG but they destroy in the JoD game. In our sample only 45 individuals (5.10%) behave according to this behavioral type.

Among individuals with mixed preferences we can classify them under three categories:

**Type Mixed 1 (Mixed prosocial):** they give more in the DG than they destroy in the JoD game. In our sample 324 individuals (36.73%) behave in this manner.

**Type Mixed 2 (Balanced preferences):** they give the same as they destroy, only 16 individuals (1.81%) can be categorized under this behavioral type.

**Type Mixed 3 (Mixed antisocial):** they give less in the DG than they destroy in the JoD game. Roughly 108 individuals (12.24%) can be classified as mixed antisocial.

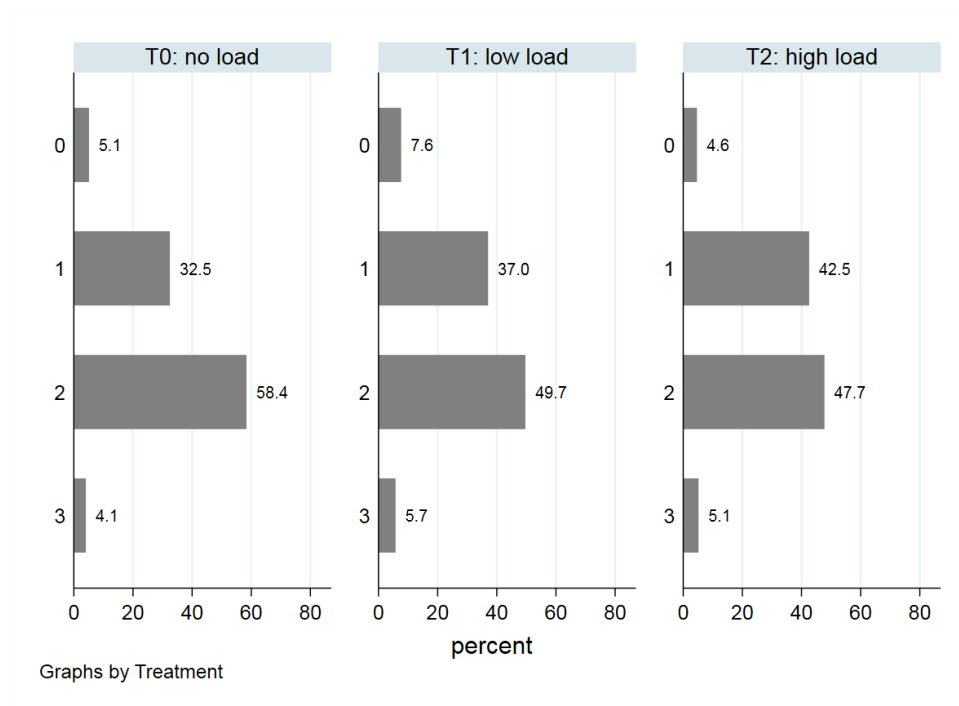


FIG. 4.4: Proportion of children by type.

Figure 4.4 shows the proportion of children in each type by treatment and Figure 4.8 (in Appendix) displays the density of children in each type. Although most of the children exhibit a mixed behavior, there is no evidence that these proportions are difference across treatments, compared to the control group,<sup>17</sup> which means that the cognitive load does not affect behavioral types.

In this sample, between 47 and 58 percent of children exhibit mixed social preferences (Type 2) in each treatment. For these individuals, giving and destroying are significantly positive correlated, i.e., the more they give in the DG the more they destroy in the JoD game. As a comparison, Sadrieh and Schröder (2016) found that one third of their student sample (170 students) exhibited similar mixed social preferences.

Examining observed characteristics of children across behavioral types, children who are classified into the antisocial behavioral type (Type 3) belong to big-sized families, are less risk-averse, more impulsive, and have lower expectations of prosocial behavior from others. Conversely, children who classified as prosocial (Type 1) are more risk-averse, more reflective, have higher social skills, understand the game better, have a higher score in the Raven's Matrices test, are more reflective, score better in the TISSI test, and expect more prosocial behavior from their partners (see Table 4.6 in Appendix).

#### 4.4.2 Regression Analysis

In this section, the empirical analysis to evaluate the effect of cognitive load on antisocial behavior is presented. Table 4.2 displays the estimations for regression models which use the results of the joy-of-destruction game. In this part of the analysis, three outcomes of antisocial behavior are evaluated; (1) the decision to reduce other's endowment, (2) the reduction as a proportion of the other's endowment, and (3) the proportion of the other's endowment destroyed conditional on a positive destruction. To estimate treatment effects, as a first approach, I estimate OLS models<sup>18</sup> as follows,

$$Y_i = \beta_0 + \beta_T Treat_i + \beta_{EB} Exp.destruction_i + \beta_{DG} DG_i + \beta_F Female_i + \beta_C Children_i + \varepsilon_i \quad (4.1)$$

In the model, described in Equation 4.1, coefficients  $\beta_T$  estimate differences across treatments. This model controls for the other's expected expected behavior  $\beta_{EB}$ , sociodemographic information, and psychological measures  $\beta_C$ .

Compared to the control group ( $T0$ ,  $m = 0.514$ ), children in the high cognitive load treatment ( $T2$ ) were more likely to decide to reduce their partner's endowment ( $p < 0.01$ , column (1) and column (2) in Table 4.2). Moreover, the proportion of income destroyed is smaller in the treatment groups compared to the control group ( $p < 0.05$ , column (3) in Table 4.2)).

The expected proportion of income destroyed by their partner is positively correlated with the likelihood of destroying (0.453 percentage points;  $p < 0.001$ ). On the other hand, if this

<sup>17</sup>  $T0$  vs.  $T1$ :  $\chi^2 p = 0.071$ ;  $T0$  vs.  $T2$ :  $\chi^2 p = 0.052$

<sup>18</sup> As a robustness check for these results, a probit model and a two-limit Tobit model are also estimated, see Table 4.7 in the Appendix. These estimations are similar to those found in the linear models.

expectation of other's antisocial behavior increases, the proportion of endowment destroyed likewise increases (0.321 percent;  $p < 0.001$ ).

Giving a positive amount in the DG increases the likelihood of destroying in the JoD game by 0.0928 percentage points. The proportion of endowment given in the DG does not affect the probability of destroying, but it is positively correlated with the proportion of other's endowment destroyed, i.e., an increase of 1 percent in the proportion given in the DG increases the proportion of endowment destroyed by 0.195 percent ( $p < 0.001$ ).

For each correct answer in the Raven's Matrices test, the probability of destroying decreases and the proportion destroyed also decreases. Last, for each correct answer in the CRT the proportion destroyed decreases, i.e., the more reflective individuals are, the smaller the proportion that they destroy.

TABLE 4.2: Joy of Destruction Game

	(1)	(2)	(3)	(4)	(5)	(6)
T1: low load	-0.083 (0.052)	-0.071 (0.054)	-0.040* (0.022)	-0.031* (0.018)	-0.038 (0.026)	-0.023 (0.019)
T2: high load	-0.133*** (0.046)	-0.116** (0.049)	-0.048* (0.025)	-0.033 (0.021)	-0.035 (0.032)	-0.017 (0.022)
Expected prop.of income reduced		0.453*** (0.065)		0.321*** (0.053)		0.367*** (0.064)
Prop. of inc. given in DG		0.0928** (0.051)		0.195*** (0.042)		0.230*** (0.056)
Decision of giving		0.093* (0.053)				
Female		0.031 (0.031)		0.0005 (0.015)		-0.010 (0.023)
Ravens matrices test		-0.017** (0.007)		-0.007** (0.00290)		-0.005 (0.004)
CRT - reflective		-0.027 (0.019)		-0.015* (0.00784)		-0.00001 (0.010)
TISSI positive		-0.003 (0.004)		-0.003* (0.002)		-0.0006 (0.003)
TISSI negative		-0.003 (0.005)		-0.0002 (0.002)		0.003 (0.003)
Comprehension of rules		0.026 (0.041)		-0.003 (0.018)		-0.001 (0.024)
Level of risk aversion		-0.012 (0.008)		-0.009** (0.004)		-0.012** (0.006)
Private school		-0.067 (0.046)		-0.033* (0.018)		-0.029 (0.022)
Nr. Siblings		0.005 (0.008)		-0.0005 (0.004)		-0.005 (0.005)
Constant	0.599*** (0.037)	0.582*** (0.159)	0.191*** (0.015)	0.216*** (0.070)	0.296*** (0.0207)	0.159* (0.088)
R squ.	0.010	0.068	0.008	0.180	0.006	0.240
R squ. adj.	0.008	0.055	0.005	0.168	0.001	0.217
Observations	882	882	882	882	453	453
Mean	0.514	0.514	0.157	0.157	0.269	0.269

Note: Columns (1) and (2) show OLS model of the decision of reducing other's endowment.

In columns (3) and (4), OLS model, dependent variable is proportion of other's endowment destroyed.

In columns (5) and (6), OLS model, dependent variable is conditional

Standard errors in parentheses and robust to heteroskedasticity.

\*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

## 4.5 Conclusion

The results of the JoD game show that the availability of doing a simultaneous task while taking the decision to destroy other's endowment would decrease the likelihood of doing so. In conflict situations among classmates at schools, alternative mechanisms could prevent conflict escalation. One possible mechanism can be based on the implementation of a productive activity that can be exerted by the potential aggressor. As a result, they can receive a benefit for themselves from this alternative activity instead of harming their classmate. In other words, even given the opportunity to harm their classmates, the probability of engaging in antisocial acts would decrease if the potential aggressors could execute a parallel productive activity that benefits themselves. For instance, a favorable policy could be to reinforce programs of extended school hours in all schools, focusing on areas where the risk of engaging in criminal activities is higher.

In this study more than half of the sample exhibited mixed preferences, i.e., they were prosocial and antisocial depending on the situation. This proportion is higher compared to similar studies, e.g., [Sadrieh and Schröder \(2016\)](#) find that only one third of individuals exhibit mixed preferences. In other words, there is evidence that adolescents' preferences diverge from adults' preferences.

Finally, this study focused on the behavior of 12-year-old children, nonetheless further research with other populations, age groups, and other contexts is necessary to enrich knowledge about antisocial behavior and its development in individuals. Moreover, destruction in this study is free of cost, however costly destruction should also be considered for future research. For instance, [Sadrieh and Schröder \(2017\)](#) find that the cost of harming or helping is negatively correlated with prosocial and antisocial behavior, however fostered research on children's behavior under these circumstances is required.

## 4.6 Appendix A

### I. Additional Figures and tables

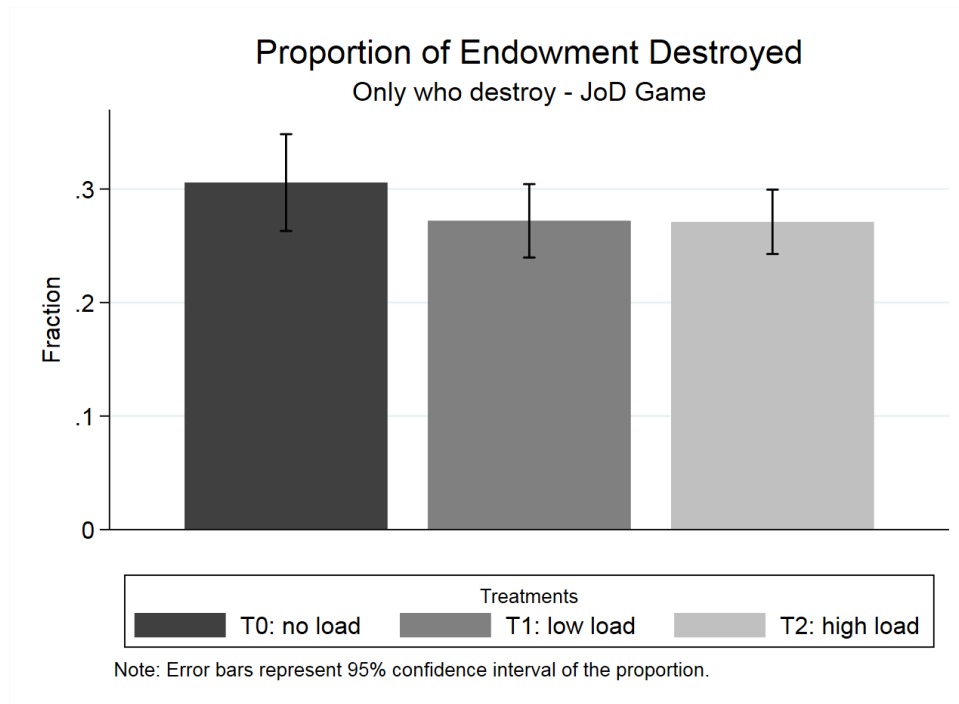


FIG. 4.5: Proportion of other's endowment destroyed for those who decide to destroy.

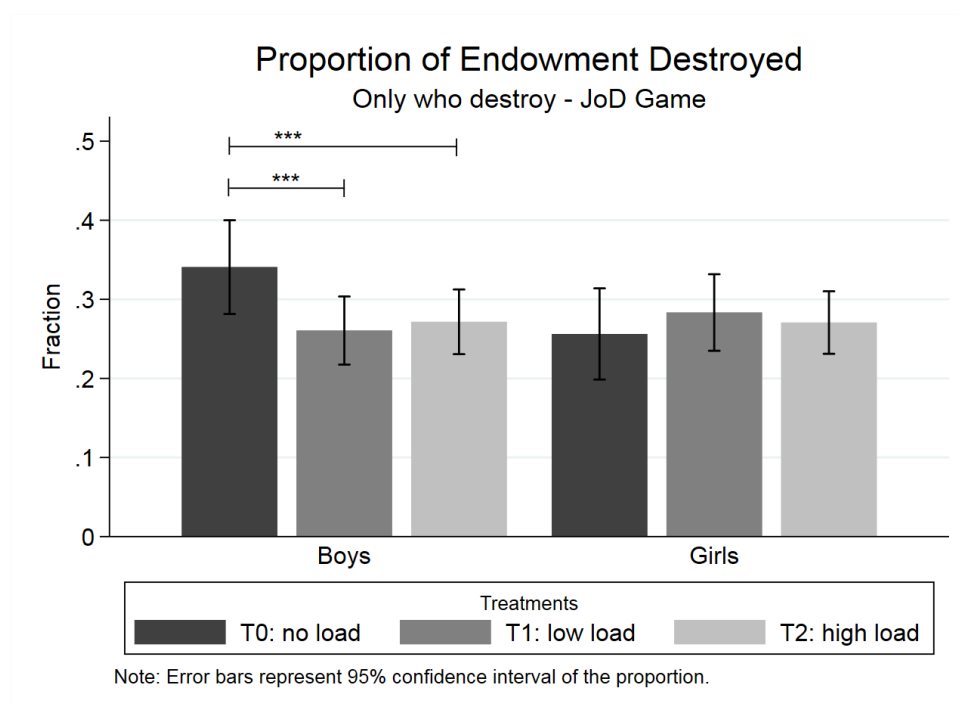


FIG. 4.6: Proportion of other's endowment destroyed for those who decide to destroy.

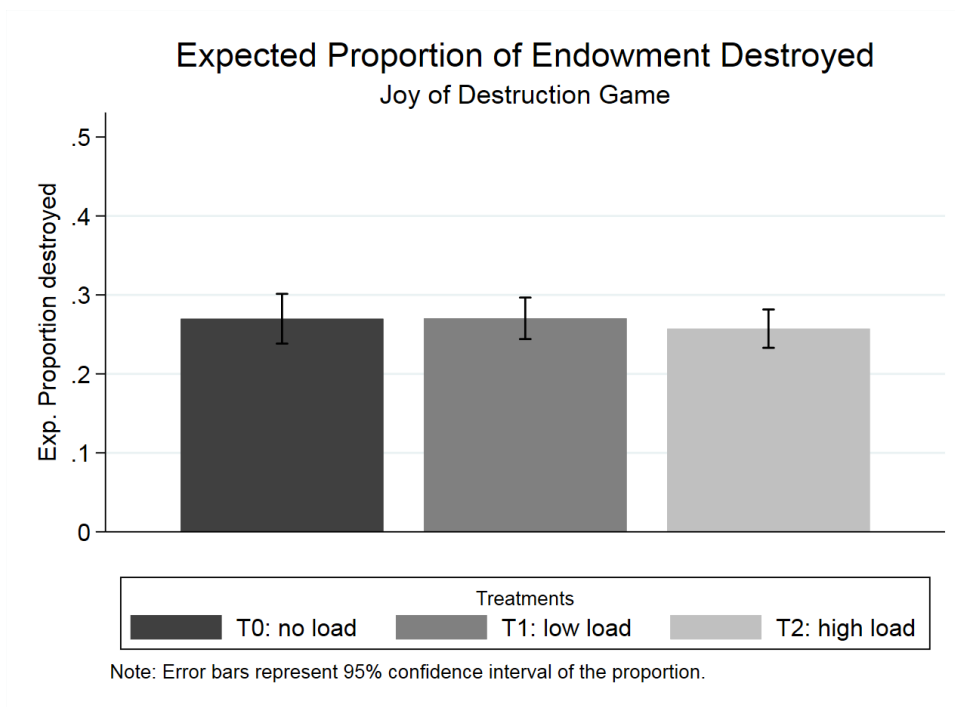


FIG. 4.7: Expected proportion of endowment destroyed by partner.

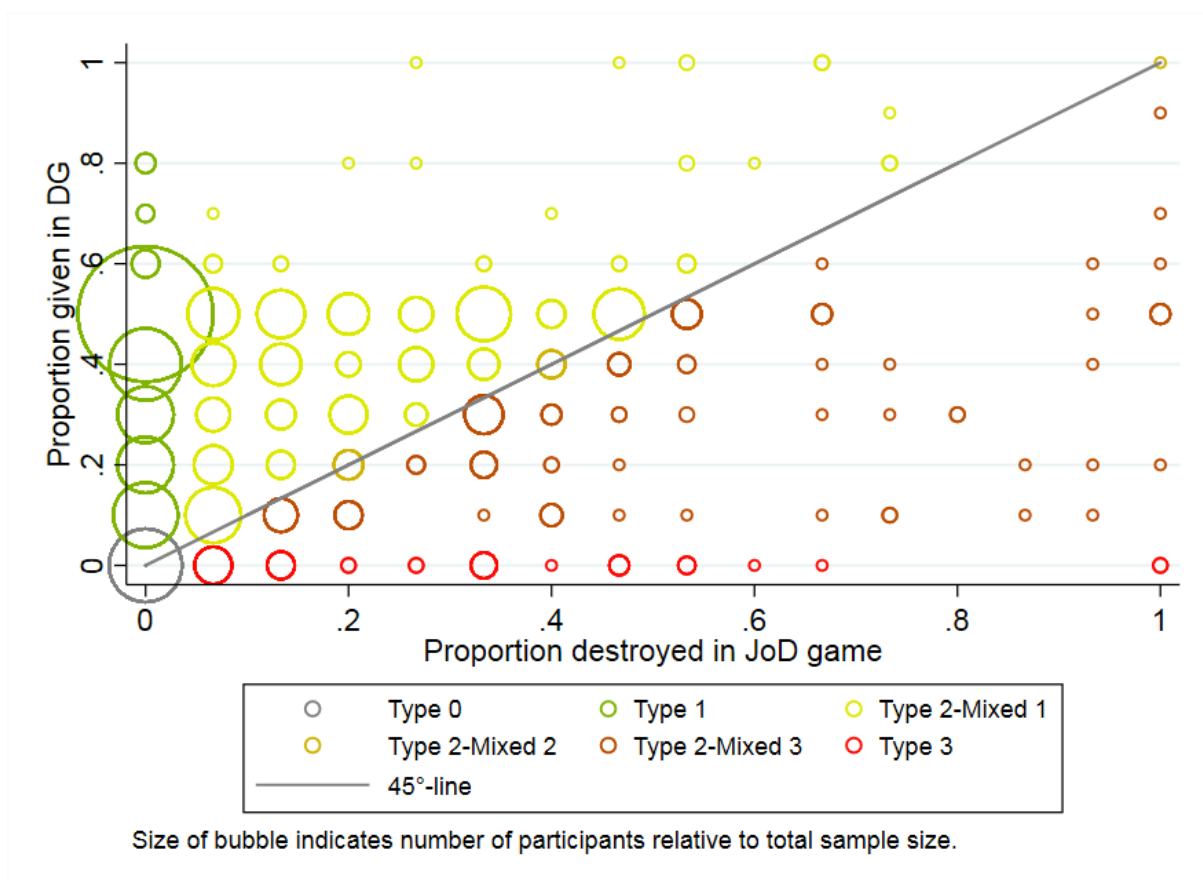


FIG. 4.8: Types.



TABLE 4.3: Summary statistics

	Mean	Std.Dev.
<b><i>Panel A: Children characteristics</i></b>		
Age	12.45	1.06
Female	0.47	0.50
Nr. of attended schools	1.74	1.33
Years in same school	5.12	2.74
Children worked in last month	0.19	0.39
Weekly pocket money (1.000 COP)	5.89	10.08
Socio-cultural activities participation	0.70	0.46
Trust friends	0.64	0.48
Trust outsiders	0.29	0.46
Cooperation better than compete	0.74	0.44
Forgiveness	2.59	0.53
<b><i>Panel B: Family characteristics</i></b>		
Total HH members	5.49	3.74
Nr. Siblings	2.11	1.81
Live with both parents	0.57	0.50
Age of father	43.01	8.36
Age of mother	38.66	7.01
Father has a job	0.97	0.17
Mother has a job	0.83	0.37
Father's education	4.29	2.00
Mother's education	4.52	1.93
Difficult economic situation in last month	0.36	0.48
<b><i>Panel C: About the game</i></b>		
Participated in similar games	0.07	0.26
Use of touch-screen devices	3.15	0.86
Comprehension of rules	2.82	0.38
Difficulty of the tasks	1.54	0.51
High income for myself	1.26	0.63
High income for group	1.40	0.59
<b><i>Panel D: Supplementary tests and elicitations</i></b>		
CRT - reflective	0.80	0.79
CRT - impulsive	2.42	0.96
Ravens matrices test	4.74	2.12
Level of risk aversion	3.06	1.63
TISSI positive	23.32	4.17
TISSI negative	14.47	3.54
Observations	882	

Notes: Reference to values of the variables.

Parents education (1=some primary; 2=primary; 3=some secondary; 4=secondary; 5=some tertiary; 6=technical; 7=professional)

Use of touch-screen devices (1=never; 2=few days a month; 3=few days a week; 4=everyday)

Comprehension of rules (1=not at all; 2=good; 3=very good)

Difficulty of the task (1=very easy; 2=easy; 3=quite hard)

High income for myself/group (0=never; 1=sometimes; 2=always)

TABLE 4.5: Orthogonality Table

	(1) T0: no load	(2) T1: low load	(3) T2: high load	(4) p-value from joint orthogonality test
Age	12.42 (0.08)	12.38 (0.06)	12.52 (0.05)	0.19
Female	0.41 (0.04)	0.49 (0.03)	0.50 (0.03)	0.10
Nr. Siblings	2.12 (0.12)	1.97 (0.09)	2.23 (0.10)	0.18
Total HH members	5.43 (0.22)	5.61 (0.27)	5.41 (0.16)	0.77
Age of father	44.20 (0.75)	42.40 (0.59)	42.88 (0.59)	0.18
Age of mother	38.70 (0.49)	38.43 (0.40)	38.84 (0.41)	0.78
Use of touch-screen devices	3.11 (0.06)	3.14 (0.05)	3.19 (0.04)	0.59
Comprehension of rules	2.81 (0.03)	2.83 (0.02)	2.81 (0.02)	0.67
Difficulty of the tasks	1.54 (0.04)	1.54 (0.03)	1.53 (0.03)	0.97
Participated in similar games	0.08 (0.02)	0.08 (0.02)	0.06 (0.01)	0.67
Level of risk aversion	3.13 (0.11)	3.10 (0.09)	3.00 (0.09)	0.61
Ravens matrices test	4.27 (0.18)	4.83 (0.11)	4.92 (0.11)	0.00
CRT - reflective	0.87 (0.06)	0.71 (0.04)	0.83 (0.04)	0.05
CRT - impulsive	2.26 (0.07)	2.50 (0.05)	2.44 (0.05)	0.02
TISSI positive	23.44 (0.30)	23.51 (0.22)	23.20 (0.22)	0.59
TISSI negative	14.45 (0.23)	14.40 (0.21)	14.57 (0.18)	0.81
Decision of giving	0.88 (0.02)	0.86 (0.02)	0.87 (0.02)	0.83
Proportion of endowment given	0.36 (0.01)	0.35 (0.01)	0.33 (0.01)	0.22
Expected prop. income given	0.42 (0.01)	0.40 (0.01)	0.41 (0.01)	0.55
Private school	0.68 (0.03)	0.79 (0.02)	0.73 (0.02)	0.01
<i>N</i>	194	314	366	
Proportion	0.22	0.36	0.42	

Notes: Mean values. Standard errors in parentheses.

TABLE 4.6: Behavioral Types

	(1) Type 0: self-interested	(2) Type 1: prosocial	(3) Type 2: mixed	(4) Type 3: antisocial	(5) p-value from joint orthogonality test of treatment arms
Treatment	1.137 (0.101)	1.275 (0.041)	1.136 (0.038)	1.244 (0.111)	0.085
Age	12.549 (0.159)	12.438 (0.055)	12.440 (0.051)	12.444 (0.173)	0.916
Female	0.647 (0.068)	0.429 (0.027)	0.480 (0.024)	0.533 (0.075)	0.022
Nr. Siblings	2.294 (0.260)	2.027 (0.094)	2.129 (0.089)	2.378 (0.241)	0.516
Total HH members	4.627 (0.271)	5.438 (0.229)	5.498 (0.164)	6.733 (0.607)	0.051
Comprehension of rules	2.686 (0.066)	2.855 (0.019)	2.821 (0.018)	2.711 (0.068)	0.005
Ravens matrices test	4.255 (0.304)	5.086 (0.112)	4.614 (0.102)	3.956 (0.284)	0.000
CRT - reflective	0.608 (0.093)	0.923 (0.046)	0.757 (0.036)	0.467 (0.082)	0.000
TISSI positive	22.235 (0.567)	23.870 (0.222)	23.138 (0.198)	22.267 (0.649)	0.004
TISSI negative	14.725 (0.420)	14.574 (0.194)	14.335 (0.168)	14.756 (0.558)	0.682
Level of risk aversion	2.686 (0.260)	3.142 (0.087)	3.098 (0.076)	2.533 (0.263)	0.038
Prop. of inc. given in DG	0.000 (0.000)	0.393 (0.009)	0.381 (0.008)	0.000 (0.000)	0.000
Exp. prop. of income given	0.396 (0.043)	0.425 (0.010)	0.404 (0.011)	0.344 (0.047)	0.114
Prop. of inc. destroyed	0.000 (0.000)	0.000 (0.000)	0.281 (0.010)	0.276 (0.035)	0.000
Exp. prop. of inc. destroyed	0.261 (0.039)	0.200 (0.012)	0.308 (0.011)	0.324 (0.034)	0.000
<i>N</i>	51	338	448	45	
Proportion	0.058	0.383	0.508	0.051	

Standard errors in parentheses.

## 4.7 Appendix B

### I. Nonlinear Regressions

TABLE 4.7: Joy of Destruction Game

	(1)	(2)	(3)	(4)	(5)	(6)
T1: low load	-0.0832 (0.0521)	-0.0856* (0.0482)	-0.0699** (0.0334)	-0.0596* (0.0304)	-0.0440* (0.0266)	-0.0311 (0.0238)
T2: high load	-0.133*** (0.0463)	-0.129*** (0.0439)	-0.0875*** (0.0325)	-0.0650** (0.0295)	-0.0381 (0.0263)	-0.0207 (0.0236)
Expected prop.of income reduced		0.415*** (0.0617)		0.476*** (0.0483)		0.369*** (0.0399)
Prop. of inc. given in DG		0.0679 (0.113)		0.267*** (0.0570)		0.223*** (0.0468)
Ravens matrices test		-0.0142** (0.00718)		-0.0135** (0.00573)		-0.00541 (0.00464)
CRT - reflective		-0.0254 (0.0210)		-0.0304** (0.0153)		0.00175 (0.0127)
TISSI positive		-0.000626 (0.00357)		-0.00477* (0.00279)		-0.00112 (0.00233)
Private school		-0.0579 (0.0434)		-0.0516* (0.0286)		-0.0359 (0.0228)
High income for myself		0.0926*** (0.0250)		0.0770*** (0.0186)		0.0369** (0.0159)
High income for group		-0.0836*** (0.0304)		-0.0383** (0.0193)		0.00496 (0.0160)
R squ.						
R squ. adj.						
Observations	882	882	882	882	453	453
Mean	0.514	0.514	0.157	0.157	0.269	0.269

Note: Columns (1) and (2) show the average marginal effects (AME) of the probit model where the dependent variable is decision of reducing other's endowment.

In columns (3) and (4), AME of a two-limit tobit model, dependent variable is proportion of other's endowment destroyed.

In columns (5) and (6), AME of a two-limit tobit model, dependent variable is conditional proportion of other's endowment destroyed.

Standard errors in parentheses and robust to heteroskedasticity.

\* p<.1, \*\* p<.05, \*\*\* p<.01

TABLE 4.8: Dictator Game

	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.0571*** (0.0197)	-0.0359* (0.0188)	-0.0232 (0.0152)	-0.00956 (0.0150)	0.00470 (0.0207)	0.0182 (0.0207)
Expected prop. income given		0.0994* (0.0532)		0.177*** (0.0330)		0.133*** (0.0439)
Ravens matrices test		0.00904** (0.00355)		0.00762** (0.00367)		0.00812 (0.00505)
CRT - reflective		0.0436*** (0.0124)		0.0290*** (0.00991)		0.0320** (0.0141)
TISSI positive		0.00653** (0.00267)		0.00421** (0.00182)		0.000980 (0.00257)
Private school		-0.0172 (0.0271)		-0.00961 (0.0184)		-0.00942 (0.0254)
High income for myself		-0.0642*** (0.0123)		-0.0240** (0.0118)		0.00312 (0.0177)
High income for group		0.0356 (0.0219)		0.0263** (0.0125)		0.0220 (0.0177)
R squ.						
R squ. adj.						
Observations	882	882	882	882	453	453
Mean	0.870	0.870	0.345	0.345	0.345	0.345

Note: Columns (1) and (2) show the average marginal effects (AME) of the probit model where the dependent variable is decision of giving in the DG.

In columns (3) and (4), AME of a two-limit tobit model, dependent variable is proportion of income given in DG.

In columns (5) and (6), AME of a two-limit tobit model, dependent variable is conditional proportion of income given.

Standard errors in parentheses and robust to heteroskedasticity.

\* p<.1, \*\* p<.05, \*\*\* p<.01

## II. Pro-social behavior (Dictator Game)

TABLE 4.9: DG Summary

	mean	sd	count
Decision of giving	0.87	0.34	882
Proportion of endowment given	0.34	0.20	882
Expected prop. income given	0.41	0.22	882

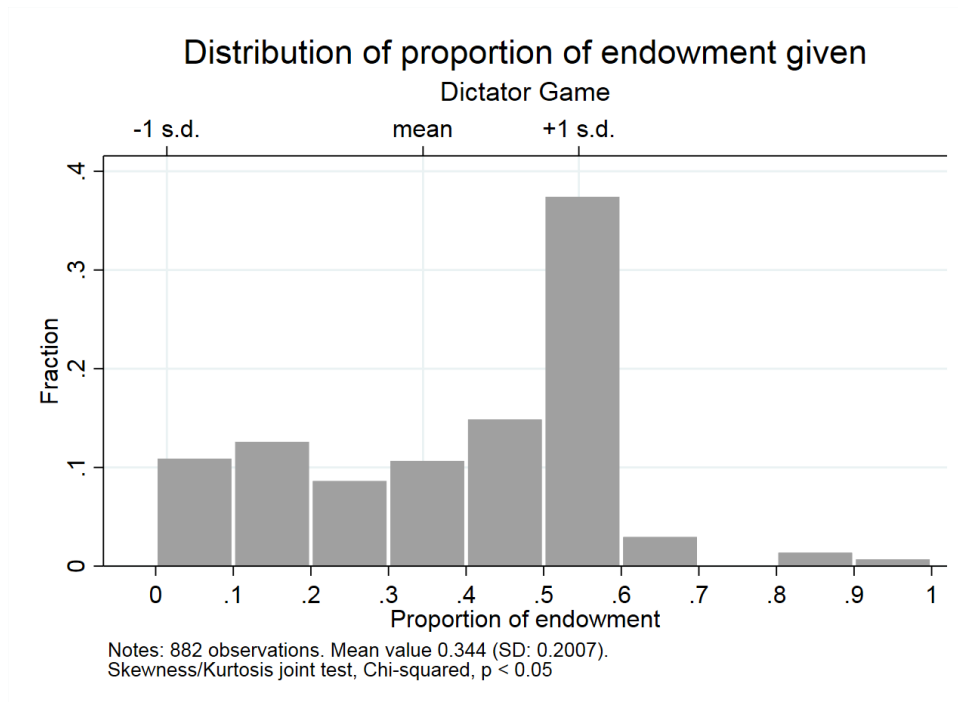


FIG. 4.9: Distribution of giving in the Dictator Game.

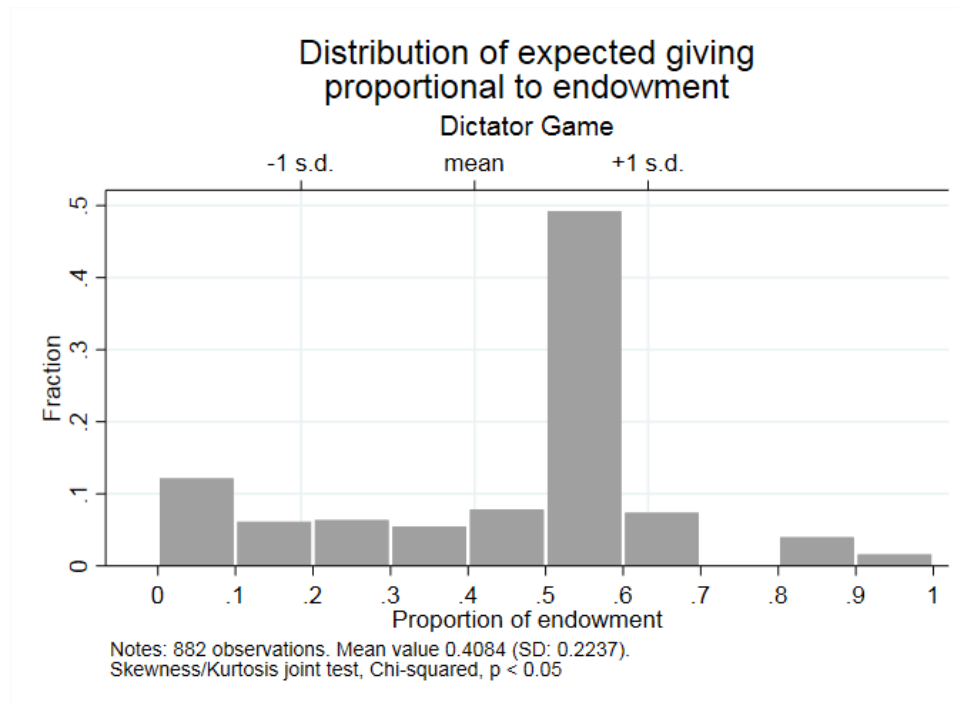


FIG. 4.10: Distribution of expected giving in the Dictator Game.

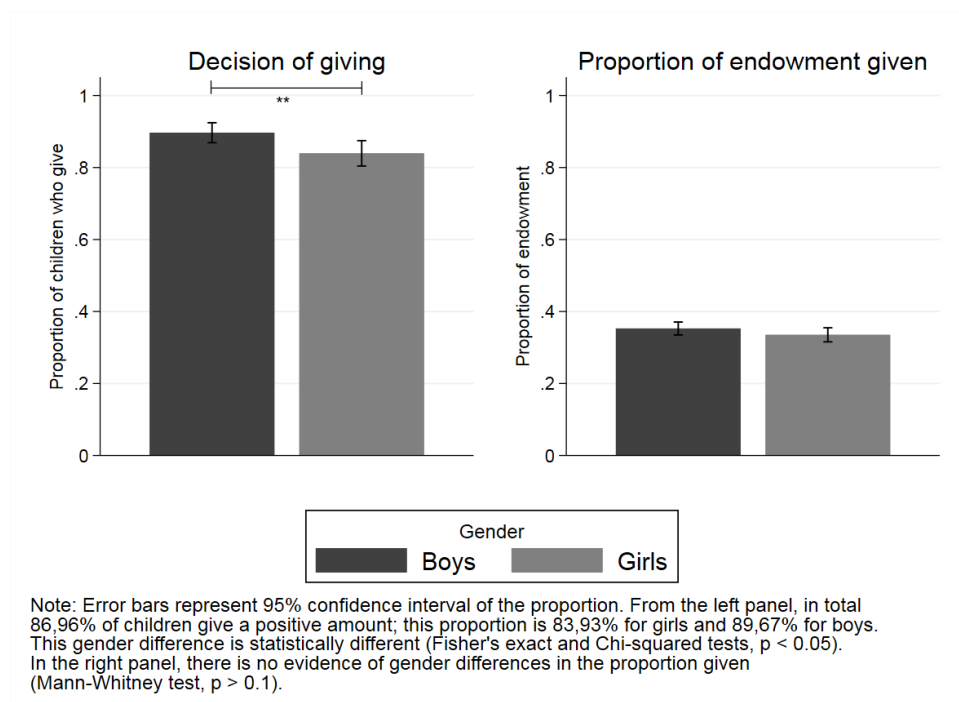


FIG. 4.11: Average results in the Dictator Game.

TABLE 4.10: Dictator Game

	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.0574*** (0.0199)	-0.0398* (0.0195)	-0.0177 (0.0128)	-0.00539 (0.0135)	0.00297 (0.0109)	0.0110 (0.0120)
Expected prop. income given		0.119 (0.0698)		0.167*** (0.0383)		0.178*** (0.0382)
Ravens matrices test		0.00931** (0.00379)		0.00676** (0.00285)		0.00396 (0.00290)
CRT - reflective		0.0385*** (0.0104)		0.0261*** (0.00934)		0.0187** (0.00809)
TISSI positive		0.00716** (0.00316)		0.00370* (0.00210)		0.00145 (0.00187)
Private school		-0.0100 (0.0209)		-0.00877 (0.0161)		-0.0115 (0.0154)
High income for myself		-0.0594*** (0.0119)		-0.0205 (0.0122)		-0.00144 (0.0130)
High income for group		0.0330 (0.0223)		0.0248** (0.0115)		0.0227** (0.00992)
Constant	0.897*** (0.0138)	0.634*** (0.107)	0.353*** (0.0121)	0.138** (0.0634)	0.384*** (0.0127)	0.215*** (0.0580)
R squ.	0.007	0.066	0.002	0.086	0.000	0.073
R squ. adj.	0.006	0.057	0.001	0.077	-0.001	0.063
Observations	882	882	882	882	767	767
Mean	0.870	0.870	0.345	0.345	0.386	0.386

Note: OLS regression. Dependent variable is decision of giving some amount in the DG in columns (1) and (2).

In columns (3) and (4) dependent variable is the proportion of income given in the DG.

In columns (5) and (6) dependent variable is the conditional proportion of income given in the DG.

Standard errors in parentheses and robust to heteroskedasticity.

\* p<.1, \*\* p<.05, \*\*\* p<.01



## 4.8 Appendix C

### I. Theoretical model of decisions and behavioral predictions

In this section, behavioral models of other-regarding preferences are used to predict individuals' behavior in this set of games. These behavioral models assume that individual  $i$ 's utility function is increasing in  $i$ 's payoffs  $x_i$ , and also that exhibits diminishing marginal utility of income<sup>19</sup>.

A the first behavioral model to consider assumes materialistic preferences, i.e. individuals' utility depends only on their own payoffs. Thus, we can write  $i$ 's utility function as follows,

$$U_i = u(x_i) \quad (4.2)$$

Here, the utility function in Equation 4.2 is independent of other's payoffs. When players follow this behavioral model, we can predict that they neither will give any amount in the dictator game nor will destroy in the Joy of Destruction game.

Another behavioral model includes altruistic preferences. In this case, individuals maximize their utility taking into consideration others' payoffs. So, an altruistic utility function in this case is,

$$U_i = u_i(x_i) + \alpha u_j(x_j), \quad \text{where } i \neq j \quad \text{and} \quad 0 < \alpha \leq 1 \quad (4.3)$$

Equation 4.3 represents a second model which predicts that if a player exhibits altruistic other-regarding preferences, thus she will never destroy in the JoD game, but will transfer a larger-than-zero amount in the dictator game.

A last behavioral model that we can consider is proposed by Abbink and Sadrieh (2009) and describes individual's preferences with joy of destruction preferences,

$$U_i = u_i(x_i) + \begin{cases} 0, & \text{for } d \leq 0 ; \\ v_j(d), & \text{for } d > 0 \end{cases} \quad (4.4)$$

In Equation 4.4,  $v_j(d)$  is increasing with respect to the amount destroyed,  $d$ , and represents a positive utility when destroying (Sadrieh and Schröder, 2016). This behavioral model predicts that individuals who are motivated by joy of destruction preferences will reduce part of their partner's endowment, but will never choose to give in the dictator game.

Although a behavioral model that predicts both pro-social behavior in the dictator game and anti-social behavior in the JoD game is out of the scope of this paper, we can identify individuals that exhibit this type of mixed behavior. According to Sadrieh and Schröder (2016), non of the existing models that include other-regarding preferences in economics can fit mixed pro- and anti-social behavior, however they acknowledge studies from anthropology and evolutionary game theory that establish a positive benefit for individuals with mixed social preferences.

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<sup>19</sup>That is,  $\partial u_i(x_i)/\partial x_i > 0$  and  $\partial^2 u_i(x_i)/\partial x_i^2 < 0$ , which implies risk aversion.

## II. Experimental instructions

### Instructions for T0-Control

Welcome all!

Before starting please open your tablet and press the update button located in the upper right corner of your screens where the icon of the house is located.

*- Wait for indication from the coordinator -*

This activity is organized by a group of students from the University of Goettingen, Germany; and will be carried out in different courses and in different schools. To make sure that everyone receives the same information, we will read the explanation.

The objective of this activity is to understand the economic decision making of middle and high-school students. During this activity, we ask you not to talk to your classmates. If you have any question please raise your hand and one of our assistants will help you.

What are we doing today?

During this activity you can earn money that will be paid in the form of food and beverages in the school store. The amount of money you receive depends on your decisions, the decisions of your colleagues and luck. The payment will not ever be made in cash, only the payment will be made in the form of consumption: potatoes, soda, etc. Regardless of the results, each of you will receive \$ 1000 pesos for participating.

In total you are going to play two independent games. Please pay close attention to the instructions that we will give you during the two games. Then we will do some very simple questions and a survey. The activity lasts one hour.

What do you have to do before you start the game?

Before starting the game, please answer the following eight questions that will appear on the screen. For each question you have to select the option that you think corresponds to the sequence or pattern shown in the figure. Let's see an example:

*- Figure of a Raven's matrix -*

On the screen you will see a figure that misses a part. In the bottom part you will find 6 different options that can be added or not, to the missing part of the figure. You have to select the option that best suits the figure shown. In this case the correct answer is number 4. As seen in the image, the black lines tend to separate while white lines join. We observe that there is a horizontal symmetry for the white lines and a vertical symmetry for the black lines. That's why the correct option is number 4. Do you have questions?

Let's start with the questions.

*- When everyone finishes with the questions, the activity continues -*

Next, you are going to play the FIRST GAME. The payments of this game depend on your INDIVIDUAL decisions and chance or luck.

We are going to show an example in order to explain what the game consists of. On your screens you will see six different circles that are divided into two colors: RED and BLUE. Each color has a different value in each option.

At the end of the game the computer will choose a random color. The payment you will receive corresponds to the selected color. Your task is to choose one of the six options shown on the screen. For example: If you select option B and the color selected by the computer is RED, you will receive 950 pesos. On the contrary, if the selected color is BLUE, you will receive 450 pesos. Do you have questions?

When the final results appear, please read them and press "next" to continue with the other game. Let's start!

*- Wait for indications from the coordinator -*

Explanation of the second game:

Please pay close attention to the explanation we are going to give you during the game. The game has a total of two rounds, however only ONE round will be selected for the final payments. In each round you will be organized in groups of TWO different people, randomly chosen by the computer in no time you will know who the member of your group is. Do you have questions?

Let's start with the FIRST ROUND:

In this round you have to do two tasks. Let's explain the first task with an example. On the screen you see a bar with the cursor located on the left at zero. You have to position this cursor exactly at 50. Please try to locate the cursor at 50 and then press 'next' to continue.

*- When everyone has pressed next, we continue -*

Let's start with the first round. You will have ninety seconds to place 10 bars at 50. If you finish the task before ninety seconds, please remain silent in your seat and wait for the ninety seconds to pass. When you finish this task you and the other member of your group will receive the same payment. Ready? Let's start!

*- Wait for the 90 seconds to pass -*

How does the game continue?

In this round, each member of the group has a different role. The player with the role "A", has to decide how to distribute the payment he receives for the task of the bars between him and the other player with the role "B". Player "A" can distribute the money as he wishes.

You have to decide as if you were the "A" player. At the end of the round the roles will be distributed randomly. If you are selected to have the role "A", you will receive the payment for the task of the bars, minus what you passed on to the other player. On the contrary, if you are selected to have the "B" role, you will receive only what the other player transferred you. Do you have questions?

Read the information that appears on the screen VERY carefully and answer the questions. Ready? Let's start!

*- Wait for indication from the coordinator -*

Please answer the following question, if the answer is correct and this round is selected to be paid, you will receive an additional 500 pesos.

- *Wait for indications from the coordinator* -

Let's start with the SECOND ROUND:

The rules of the game in this round are DIFFERENT. Please pay close attention to the explanation. In this round you will also perform two tasks. The first task is the same as the previous round. Then you will find 10 bars, which have to be positioned exactly at 50 in ninety seconds. If you finish the task before ninety seconds, please remain silent and wait for the ninety seconds to be over. When you finish this task you and the other member of your group will receive the same payment. However, what you will receive in this round will be different from the previous round. Ready? Let's start!

- *After 90 seconds continue with the explanation* -

How does the game continue?

As in the previous round, each member of the group has a different role. One player will have the "A" role and the other the "B" role. The player with the "A" role has to decide whether or not to reduce the payment that player "B" receives.

You have to decide as if you were the "A" player. However, at the end of the round the roles will be distributed randomly. If you are selected to be the "A" player, you will receive payment for the task of the bars. On the other hand, if you are selected to be player "B", he will receive the payment for the task of the bars minus what the "A" player decided to reduce him/her.

*Instructions T1 and T2:* Before you make their decision, a sequence of colors will be displayed. You have thirty seconds to memorize it. If at the end of the round you select the correct sequence, you will additionally receive \$1000 pesos if this round is selected to be paid.

Do you have questions? Read the information that appears on the screen VERY carefully and answer the questions. Ready? Let's start!

- *Wait for indications from the coordinator* -

Please answer the following question, if you answer it correctly, you will accumulate 500 pesos additionally to your payments in this round.

- *After answering the last question, continue* -

Next you will know the result of the game. You will know which round was selected to be paid. You will also know if you were selected to have the "A" or "B" role and their final payment. Please read the results and we continue with some riddles.

- *Wait for indications from the coordinator* -

Now, you have to solve the following riddles with different level of difficulty. Please try to answer as many questions as you can. If you are not sure of the answer, write what you think is right. In this task the assistants cannot help you, you must answer on your own. When you finish answering the riddles, we continue with the final questionnaire. Let us begin!

- *Wait for the coordinator's instructions to continue with the questionnaire.* -

Now you will answer the questionnaire that appears on the tablet. They are very simple questions.

You can start.

Thank you to the teacher for giving us the space and to you (students), thank you very much for participating in this activity!

Now we will wait for the teacher's instructions.

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### III. Cognitive Reflection Test (CRT)

Participants answer 5 questions that measure reflection. Among these questions, two questions are part of the standard CRT ([Frederick, 2005](#)), two question are taken from an alternative CRT, and one is a decoy question ([Thomson and Oppenheimer, 2016](#)).

1. A bat and a ball together cost 110 cents. The bat costs 100 cents more than the ball. How much does the ball cost? (spontaneous answer: 10 cents; correct answer: 5 cents)
2. If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? (spontaneous answer: 100 minutes; correct answer: 5 minutes)
3. If you are running a race and you pass the person in second place, what place are you in? (spontaneous answer: first place; correct answer: second place)
4. A farmer had 15 sheep and all but 8 dies. How many are left? (spontaneous answer: 7 sheep; correct answer: 8 sheep)
5. A cargo hold of a ship had 500 crates of oranges. At the ship's first stop, 100 crates were unloaded. At the second stop, 200 more were unloaded. How many craters of oranges were left after the second stop? (correct answer: 300 crates)

#### IV. Teenage Inventory of Social Skills (TISSI)

The first psychological measure we use is a collection of selected five positive and five negative items from the TISSI ([Inderbitzen and Foster, 1992](#)). For each item participants have to select one option from five-point Likert scale from zero to five, where zero means it does not describe participant at all, and five means that the item describes participant totally. Participants see the items in a random order.

Positive items:

1. I help others guy with their homework when they ask me for help.
2. I tell other classmates that played a game well when I lose.
3. I offer to share something with other guys when I know that they would like it.
4. I thank other guys when they have done something nice for me.
5. I do my share when working with a group of classmates.

Negative items:

1. I forget to return things that other guys loan me.
2. I lie to get out of trouble.
3. I hit other guys when they make me mad.
4. I throw things when I get angry.
5. I call classmates bad names to their faces when I am angry.

## V. Elicitation Method for Risk Preferences

A modified design of [Binswanger \(1980\)](#) was implemented. To illustrate probabilities circles divided in two colors were shown.

**Elija una de las siguientes opciones:**

<input type="radio"/> A	<b>Opción A</b> 	<input type="radio"/> B	<b>Opción B</b> 
<input type="radio"/> C	<b>Opción C</b> 	<input type="radio"/> D	<b>Opción D</b> 
<input type="radio"/> E	<b>Opción E</b> 	<input type="radio"/> F	<b>Opción F</b> 

Siguiente

FIG. 4.12: Elicitation of risk preferences



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