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Contents lists available at ScienceDirect

Journal of Economic Behavior & Organization

journal homepage: www.elsevier.com/locate/jebo



Prosocial norms in the classroom: The role of self-regulation in following norms of giving

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ARTICLE INFO

Article history:

Received 31 January 2014

Received in revised form 8 September 2014

Accepted 19 October 2014

Available online xxx

Keywords:

Prosocial norms

Self-regulation

Children

ABSTRACT

Children who are prosocial in elementary school tend to have higher academic achievement and experience greater acceptance by their peers in adolescence. Despite this positive influence on educational outcomes, it is still unclear why some children are more prosocial than others in school. The current study investigates a possible link between following a prosocial norm and self-regulation. We tested 433 children between 6 and 13 years of age in two variations of the Dictator Game. Children were asked what they should or would give in the game and then played an actual DG. We show that most children hold a common norm for sharing resources, but that some children fail to follow that norm in the actual game. The gap between norm and behavior was correlated with self-regulation skills on a parent-report individual differences measure. Specifically, we show that two components of self-regulation, attention and inhibition, predict children's ability to follow the stated norm for giving. These results suggest that some children are poorer at holding the norm in mind and following through on enacting it. We discuss the implications of these results for education and programs that promote social and emotional learning (SEL).

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1. Introduction

In the past two decades, research on educational outcomes has demonstrated the importance of positive social behaviors in fostering academic achievement. Educational programs focusing on the development of children's social competencies, called Social and Emotional Learning or Positive Youth Development programs, have gained in popularity as a means of creating a positive environment for learning, increasing student's test scores and improving student's social skills (Catalano et al., 2004; Durlak et al., 2011; Greenberg et al., 2003). These programs typically seek to promote prosocial behavior and prosocial norms in order to improve children's social competence. Better social skills may then indirectly lead to academic achievement. However, prosocial behavior also has direct links to preferred educational outcomes. For example, in a longitudinal study, prosociality at 8 years of age predicted academic achievement and peer acceptance at 13 years of age (Caprara

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et al., 2000). The link between prosocial behavior and peer acceptance has also been shown in a month-long, intervention experiment for 9–12-year olds with random assignment to experimental condition (Layous et al., 2012). Given the desirable outcomes linked to prosociality, a deeper understanding of how and why children behave prosocially is an important step toward improving interventions designed to promote these social behaviors.

Prosocial behavior depends in part on children's ability to control their behavior, so-called self-regulation (Eisenberg, 2000). Self-regulation refers to the psychological processes that allow people to engage in goal-directed activities (Blair and Razza, 2007; Zhou et al., 2012). Within developmental psychology, self-regulation has primarily been studied under two broad frameworks referred to as "effortful control" and "executive function." Although each framework carves self-regulation into different component processes, they share two components in common that are important for prosocial behavior: attentional control and inhibitory control (Zhou et al., 2012).¹ Attentional control refers to the ability to hold information in mind that is relevant for completing a task and to focus on the task without getting distracted. Inhibitory control refers to the ability to suppress a dominant or impulsive response and includes behaviors such as waiting one's turn and resisting temptation.

For prosocial behaviors, attentional control and inhibitory control are engaged in different ways depending on the behavior. For example, in order to help others children must identify what another person is trying to do and hold that goal in mind (attention), disengage from what they are currently doing (inhibition) and then execute a plan of action to help the person achieve the goal (attention). When giving to others, children need to resist the temptation to keep the resource for themselves (inhibition), decide how much to give and hold it in mind (attention) and then follow through on the act of giving (attention). A positive relationship between these two components of self-regulation and prosocial behavior has been found in several studies. For example, children with higher ratings for attentional control (by parents and teachers) were more likely to be identified by their peers as being helpful and likely to share (Eisenberg et al., 1996, 2000). In addition, children who perform better on inhibitory control tasks have been found to be more prosocial in play tasks with peers (Wilson, 2003; Giannotta et al., 2011).

In the current study, we focus on how attentional and inhibitory control support altruistic giving in elementary school children. Our study builds on research showing that children as young as 3 years of age recognize a norm of giving (an equal split) but do not follow that norm until they are older (Rochat et al., 2009; Smith et al., 2013). The reason for the gap between norms of giving and actual behavior remains unclear but both attention (holding the norm in mind) and inhibition (resisting the temptation to keep the resource) may be involved. To examine this possibility, we used an experimental task – a modified version of the Dictator Game (DG; Forsythe et al., 1994) – and a standardized questionnaire for parents – the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1994, 1997) which allowed us to assess individual differences in attentional and inhibitory control. Before playing the Dictator Game, children were asked to state either the norm for giving (what one should give) or what they would give in a hypothetical Dictator Game.

Our results confirm that both attention and inhibition make separate contributions to children's giving. Children who were primed to think about the norm gave more than children who were asked what they would give, but this effect occurred primarily for children with higher ratings on the components of self-regulation. More specifically, better inhibitory control and better attentional skills both contributed to children's ability to give amounts that were closer to their stated norm for giving. Moreover, this ability to "close the gap" between the norm and actual giving appeared only for older children.

The remainder of this paper is organized as follows. Section 2 provides background literature on the development of prosocial giving and self-regulation. Section 3 describes the experimental design and predictions for the study. Section 4 describes the analyses and results. Section 5 contains a discussion of the findings and their relevance for education.

2. Background

Research on children's giving behavior, using both field observations and controlled experiments, has shown that giving generally increases with age (Eisenberg et al., 2006). Recent studies have shown this pattern using versions of the Dictator Game (DG; Forsythe et al., 1994) modified for children. In the typical child DG, one child is given a set of resources such as stickers or candy and told that they can keep them all or give some to another child who is not present. Across several studies using different kinds and numbers of resources the same pattern emerges: 3–4-year-olds show a strong self-interested bias and average donations increase with age but rarely exceed 50% of the stake (Benenson et al., 2007; Blake and Rand, 2010; Fehr et al., 2008; Gummerum et al., 2010; Harbaugh and Krause, 2000; Moore, 2009; Rochat et al., 2009). What is more surprising is that children as young as 3 years of age recognize giving half as a prosocial norm even though they do not follow that norm. One recent study demonstrated this gap between stated norms and actual giving in a DG modified for 3–8 year olds (Smith et al., 2013). Children in one condition were given 4 stickers and told that they could keep them all or give

¹ The effortful control framework was developed to study socio-emotional development and temperament (biologically based traits) and includes components for inhibitory control, attention focusing and shifting, conflict detection and resolution, and planning (Eisenberg et al., 2001; Posner et al., 2007; Rothbart et al., 2004). The executive function framework focuses less on emotional responses and more on cognitive processes that affect behavior. It is used for research in cognitive neuroscience and clinical psychology and includes components for inhibition, cognitive flexibility and attention, and working memory (Casey et al., 1997; Davidson et al., 2006; Rueda et al., 2004, 2005). For discussions of these two frameworks and the relationship between them, see Zhou et al. (2012) and Blair and Razza (2007). Here, we follow Zhou et al. in focusing on the two components of self-regulation shared by both frameworks: attentional control and inhibitory control.

some to another child who they would never meet. Children in another group were also given four stickers but were asked to imagine that they could give some to another child and asked what they *should* give. At all ages, children in the norm condition stated that they should give approximately half of the stickers to the other child in the task, but children in the actual DG tended to favor themselves. Children also believed that this “equal split” norm applied to other children as well, a finding supported by children’s decisions in third-party judgment tasks (Olson and Spelke, 2008).

The failure to follow norms of fair allocation in the DG may be due to a failure of self-regulation, specifically, the components of attentional and inhibitory control. When faced with an opportunity to give to others, one may consider the norms for giving or what one should give (attention) and also resist the temptation to be self-interested (inhibition). Connections between self-regulation and giving behavior have been found for both adults and children, but studies have focused primarily on inhibitory control. For example, in a repeated DG for adults, participants who made faster decisions, an indication of low inhibitory control, tended to make more self-interested choices (Piovesan and Wengström, 2009). Another adult study used a questionnaire to measure inhibitory control and found that participants with better inhibitory control tended to be more generous in a one-shot DG (Martinsson et al., 2012).

Existing research on children’s giving and self-regulation has used behavioral measures of self-regulation such as the day/night task (Gerstadt et al., 1994). In this task, children are shown images of a sun and moon in mixed order and instructed to say “day” when they see the moon and “night” when they see the sun. The advantage of this task is that it requires children to hold the day/night rule in mind (attention) and inhibit the impulse to say “day” when they see the sun and “night” when they see the moon. Two recent studies using this task and a DG found conflicting results. One study found that children who scored higher on the day/night task were more willing to give at least one item to the recipient in a DG (Aguilar-Pardo et al., 2013). In contrast to this result, a study using the same measures failed to find a relationship between inhibitory control and giving behavior after controlling for age (Smith et al., 2013). Children’s performance on the day/night task improved with age, but did not explain any additional variation in children’s giving behavior in a DG.

Although studies have focused on the potential link between giving and inhibitory control, attentional control may also be relevant for explaining why children give more with age. Children may recognize the norm of an equal split when asked directly what one should give, but they may not call that norm to mind when they face an actual giving situation. The relevance of norms of giving may increase with age, making older children more likely to think about the norm before deciding how much to give. Some evidence for this possibility comes from another condition in Smith et al. (2013). When children were asked to predict what they *would* give if they had the opportunity to share with a peer, children’s predictions were more in line with the actual donations for their age group than the stated norms. The authors concluded that children did not plan to share fairly and then fail when faced with an actual sharing task, a possibility that would implicate inhibitory control. Rather, children did not have the norm of an equal split in mind at all until they reached about 7 years of age.

Additional evidence for a relationship between attentional control and giving comes from a study in which 6 to 13-year-olds played both a Dictator Game and an Ultimatum Game (UG) (Steinbeis et al., 2012). The UG differs from the DG in that the child on the receiving end of the allocation can reject the offer, in which case neither child gets anything. In general, both children and adults propose more equal allocations in the UG than in the DG because they know that the partner will probably reject unfair offers (Camerer, 2003). In Steinbeis et al., children performed these tasks in an fMRI machine and were also tested on a measure of inhibitory control. The results showed that DG offers did not change with age but UG offers did, indicating that children made more fair offers when faced with the possibility of the recipient rejecting the offer. The increased giving in the UG was highly correlated with better inhibitory control and with activation of the left dorso-lateral prefrontal cortex (IDLPC), an area implicated in behavioral control. These results suggest that children with better inhibitory control were not more generous (the DG measure). Rather, they were better at bringing to mind the norm of fairness and following it in the UG, two processes related to attention.

3. Experimental design and predictions

In the current study, we assess the relationship between children’s giving in the Dictator Game and their attentional and inhibitory control. We extend prior research by using a priming experiment and by using a standardized parent questionnaire for assessing self-regulation that is reliable for the range of ages in elementary school, between 6 and 12 years of age in the current sample.

3.1. Participants

A total of 508 children were recruited from Italian primary schools in the district of Treviso in the region of Veneto as part of a larger scale study. Five different schools with grades from first to fifth were used for this study, for a total of 27 classes participating. About one week before the experiment, we distributed to children’s parents (or legal guardians) a flyer with a description of our study and a consent form that they had to sign if they agreed to allow their child(ren) to participate.

In addition, we asked parents to complete a questionnaire in which we asked about (1) the family; (2) their child’s extra school activities; and (3) the self-regulation questionnaire for each child. Parents could refuse to answer all or part of this questionnaire. The questionnaire had no personally identifying information, only an ID that was also used in the subsequent weeks to identify the child. Eighty-five percent of parents completed the self-regulation questionnaire and were used in the current study, for a total of 433 participants. All tasks and questionnaires were in Italian.

Children ranged in age from 76 months (6 years, 4 months) to 153 months (12 years, 9 months); approximately 50% of the children were female (six children were missing gender information). Twenty-six children were missing their date of birth information but had grade information. For these children the average age for their grade was used.

3.2. Dictator Game (DG)

Prior studies suggest that children may not think of norms of giving at all when doing a Dictator Game (Smith et al., 2013). Thus, in order to test the relationship between children's giving and attentional and inhibitory control we primed children to think of the norm before they participated in an actual DG. To accomplish this, we modified the design of Smith et al. (2013). In that study, children in the Self-Share/Other-Norm condition first played the DG to measure their actual donations and then were asked about the norm for giving – what one *should* give. We reversed the order of these two tasks in order to induce children to think about what one should give before they engaged in actual giving. A separate group of children were asked to state what they *would* give in the DG before they engaged in actual giving.

One key decision in Dictator Games for children concerns which resources to use. The choice of resource can influence how much children are willing to give at different ages. Although stickers are often used (i.e., Benenson et al., 2007; Blake and Rand, 2010; Smith et al., 2013), children older than about 8 years of age no longer desire stickers and thus may be more willing to give them away. Candy has also been used in DGs with children (i.e., Fehr et al., 2008), but many schools and parents do not want their children to receive candy. Tokens which can be used to purchase prizes present another alternative (Harbaugh and Krause, 2000). However, younger children may not have experience with currencies (Faigenbaum, 2005), and the symbolic nature of tokens may facilitate children's ability to resist temptation, as has been found in studies of delay of gratification (Mischel et al., 1989).

For the current study, we sought a resource that would be valuable to children at all ages in elementary school and acceptable to the schools. About six months prior to starting the study, we visited classes of children within the school district to pre-test the desirability of different rewards. In each of the grades we were testing, silly bandz proved popular (www.sillybandz.com). Several studies have now also used this resource in different economic games with children (e.g., Houser et al., 2012; Maggian and Villevall, 2013; Chen et al., 2014; Devetag et al., 2013). After running our study, we evaluated the desirability of silly bandz at different ages by comparing the percentage of children who gave all of the items away (max of 4). Overall, 5.91% (30/508) of the children participating the study donated all 4 bands. According to a Fisher's exact test, the proportion of children donating all 4 bands did not differ across grades ($p = 0.450$, $N = 508$) or age ($p = 0.179$) (see Appendix, Table S1). Similar results are obtained if we repeat this test separately for boys and girls ($p = 0.561$, $N = 235$; $p = 0.710$, $N = 232$). Given these results we feel confident that children at all ages tested valued silly bandz.

Classrooms were randomly assigned to one of four conditions: two Public conditions and two Private conditions. In the *Public condition*, children were informed at the beginning of each game that, at the end of each game, all children's names and their individual decisions/outcomes in the Dictator Game would be written on the blackboard for every child to see. In the *Private condition*, children were told that their decisions/outcomes would not be revealed. The Public and Private conditions were originally included to test for the effects of reputation on decisions. This difference was assessed in our preliminary analyses, which we describe below, and did not produce any significant effects. Thus, this distinction is not discussed further in this study.

The experiment had two phases and two primary conditions. In Phase I, classrooms were assigned to one of the two conditions: Norm or Hypothetical. In both conditions, children were asked to imagine a situation in which they had four silly bands and could share some with a child of the same gender in another school. In the *Norm condition*, children were then asked to “think of what *one should* do in this situation. How many bands do you think *one should* share with another child?” In the *Hypothetical condition*, children were asked “think of what *you would* do in this situation. How many bands do you think *you would* share with another child?” In both conditions, children were instructed to think about their response in private and to write their response on a sheet of paper. During this phase, children were not told that there was more to the experiment.

In Phase II, children were told that they would do another task—a real Dictator Game with four silly bands. Children were told that their responses in the first step were not binding. All children made their decision in private: one child at a time would step out of the classroom with four bands and an empty envelope that had their individually assigned ID written on it. They were instructed to put in the envelope any bands they wanted to donate and hide any bands they decided to keep for themselves (i.e., in their pockets) before coming back to the room. Upon return to the classroom, they handed the envelope to the experimenter and were reminded to not reveal their decisions. At the end of the study, the envelopes with the bands were randomly and anonymously donated to other children from other participating classes but only after those other children had completed their study. Thus, each child was once a giver and once a receiver but when making their allocation decisions as givers, children were not aware that they would also be receivers.

3.3. Self-regulation measure

In order to assess the role of self-regulation in children's giving, we needed a measure that could be used for children at all ages of elementary school. One limitation of behavioral measures of self-regulation such as the Day/Night task is that children tend to perform at ceiling by 7 years of age (Lagattuta et al., 2011). Parent and teacher questionnaires offer an

alternative measure which can be used across a broader age range. We chose the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1994, 1997) which has been validated for children between the ages of 6 and 14 years of age and tested in several countries including Italy (Becker et al., 2006). We used the Italian parent report version for children 4–16 years of age (available at <http://www.sdqinfo.com>). The SDQ was distributed to parents along with the consent forms about one week before the experiment. Parents are asked to respond based on their child's behavior over the past 6 months.

The SDQ consists of five subscales which measure different aspects of children's behavior: Inattention/Hyperactivity, Emotional Symptoms, Conduct Problems, Peer Problems, and Prosocial Behavior (see Appendix for full questionnaire). We asked parents to complete the entire questionnaire (25 questions) in order to confirm the validity of the questionnaire.² Eighty-five percent of parents completed the questionnaire ($N=433$) and were used in all subsequent analyses. For this sample, the five subscales of the SDQ were correlated as expected, with the four negative constructs (Hyperactivity, Emotional Symptoms, Conduct Problems, and Peer Problems) all positively correlated (Pearson's $r_s > 0.236$, all $p_s < 0.001$). The one positive construct, Prosocial Behavior, was negatively correlated with the other constructs ($r_s > 0.16$, $p_s < 0.001$) with the exception of a non-significant correlation with Emotional Problems.

Only one of the subscales, Inattention-Hyperactivity, was relevant for our assessment of self-regulation. The scale consists of five questions, two of which measure inhibitory control: (1) restless, overactive, cannot stay still for long; (2) constantly fidgeting or squirming. Three questions measure attentional control: (3) easily distracted; (4) thinks things out before acting; (5) sees tasks through to the end, good attention span. This short subscale compares favorably to longer questionnaires that measure self-regulation such as the Child Behavior Checklist (Achenbach, 1991; Goodman and Scott, 1999). In addition, two recent studies showed a significant correlation between children's performance on behavioral measures of attention and inhibition, such as the day/night task, and the Inattention/Hyperactivity scale of the SDQ (Happé et al., 2006; Hughes and Ensor, 2007).

Scores on the subscales can be assessed as continuous variables or categorized as Normal, Borderline or Abnormal based on criteria from the web site (<http://www.sdqinfo.com>). Typically, 10% of a community sample will fall in the Abnormal range and another 10% will be classified as Borderline. For the Inattention/Hyperactivity scale for the current sample, these categories were smaller than expected: 7.4% Abnormal and 5.3% Borderline.

To limit the use of new terminology and maintain clarity, in the remainder of this paper we will refer to the Inattention/Hyperactivity scale simply as Self-regulation.

3.4. Additional measures

Parents were also asked to supply additional information about themselves and their children: the child's gender, ages of siblings, parent and spouse education, marital status, whether the child receives an allowance. The sibling information was used to create dummy variables for Any Siblings, Older Sibling, Younger Sibling, and a continuous variable for Number of Siblings. Parent and spouse education levels were used to create an ordinal scale based on the highest education level attained in the household: high school or lower; bachelor's degree; or masters degree.

3.5. Predictions

Based on our experimental design and prior results from the literature described above, we made several predictions. First, we predicted that in Phase I children would state that they should give more in the Norm condition than they would give in the Hypothetical condition (1). This prediction is based on the result from Smith et al. (2013) in which children stated that they should give more in a Dictator Game than they would give. With age, children tend to converge on saying that they should and would give an equal split. This leads to a secondary prediction that the difference between children's responses for should and would will diminish with age (1a).

The condition manipulation in Phase I was intended to induce children to bring different amounts to mind that would guide their actual donations in Phase II. We expected that stating the norm (should) would create a stronger sense of obligation to follow that norm compared to predicting what one would give in a hypothetical situation (would). Thus, we predicted that children would give more in the Norm compared to the Hypothetical condition (2). In addition, given that children give more with age in Dictator Games and tend to reach a ceiling of giving an equal split (Benenson et al., 2007; Blake and Rand, 2010), we expected that the difference between conditions for actual giving would diminish with age (2a).

Our main predictions concerned the relationship between self-regulation and children's ability to follow the norm for giving. We hypothesized that children with better self-regulation would be better at holding the norm for giving in mind and following it during the actual giving phase. The following predictions thus focus on the difference between children's stated donations and actual donations (the "gap"). We predicted that children with lower (normal) Self-regulation scores

² The questionnaire has been validated when fully completed and when the questions appear in the standard sequence (Goodman, 1997). The five questions related to the attention and inhibition components of self-regulation are not clustered together. We asked parents to complete the full questionnaire in order to maintain the validity of the instrument, but 75 parents did not complete all of the questions. Prior to any analyses, we decided to exclude children with incomplete questionnaires. See Appendix for the full questionnaire and a comparison of DG results for the full sample ($N=508$ children) and the subset with completed questionnaires ($N=433$ children).

Table 1

Participants in each condition by year of age (two 6-year-olds were added to the 7-year-old group). Young and old groups were created using a median split on age.

Age group	Norm	Hypothetical	Total
7	34	36	70
8	30	47	77
9	80	27	107
10	43	39	82
11	36	38	74
12	13	10	23
Young (<9.51 years)	103	98	201
Old (>9.5 years)	133	99	232
All (7–12)	236	197	433

would give amounts in the DG that were more closely aligned with what they said they *should* give in the Norm condition (3). Further, we predicted that the Self-regulation effect in the Norm condition would be driven by differences in what children gave as opposed to what they said the norm was. Specifically, in the Norm condition, we predicted that children's stated norm for what they should give would not vary by level of Self-regulation (3a). Rather, we predicted that children with better Self-regulation in the Norm condition would actually give more (3b). We did not expect a similar effect of Self-regulation on children's giving in the Hypothetical condition (3c).

Given that children close the gap between what they say they should give and what they actually give with age (Smith et al., 2013), we predicted that the differences in Self-regulation groups would underlie this change. Just as children with normal Self-regulation scores on the SDQ show higher achievement in school with age (Saudino and Plomin, 2007), we expected older children with normal Self-regulation to close the gap between what they should give and what they actually give. Thus, we predicted that older children with Normal Self-regulation would have smaller Difference Scores for the Norm condition compared to older children with Poor Self-regulation (4). We did not have a clear prediction for how self-regulation would affect the Difference Scores for younger children.

Lastly, we expected that the different components of Self-regulation, as measured by specific questions in the subscale, would predict the difference between norms and giving. Specifically, we predicted that the three attentional control questions would predict children's ability to follow the stated norms (5). Given the mixed results in prior studies for the relationship between inhibitory control and children's giving, we tentatively predicted that the inhibitory control questions would also predict smaller Difference Scores (5a).

4. Results

The final sample consisted of $N=433$ children in two conditions: $n=236$ in the Norm (should) condition and $n=197$ in the Hypothetical (would) condition (Table 1). Descriptive statistics for all variables used in the analyses appear in Table S3 in the Appendix. To test our age-related hypotheses using non-parametric tests, we divided children into younger and older age groups using a median split on age (9.5 years of age).³

To test Prediction 1, we compared what children stated they should and would give in the Norm and Hypothetical conditions, respectively (Fig. 1). For all ages combined, children stated a greater number of resources in the Norm compared to the Hypothetical condition: mean (st. dev.) for Norm condition = 2.381 (0.87), for Hypothetical condition = 2.056 (1.14), Mann–Whitney test, $p < 0.01$. However, consistent with Prediction 1a, the difference was significant only for the younger age group: Younger Norm = 2.524 (.97), Hypothetical = 1.816 (1.33), Mann–Whitney test, $p < 0.001$; Older Norm = 2.271 (0.77), Hypothetical = 2.293 (0.85), Mann–Whitney test, $p = 0.478$. Thus, as predicted, children said that they should give more than they said that they would give in a Dictator Game, but the difference between should and would decreased with age primarily due to an increase in what children said they would give.

Our second set of predictions (2 and 2a) concerned whether asking children what they should or would give in Phase I induced children to give different amounts in Phase II. For all ages combined, children gave more in the Norm condition than they did in the Hypothetical condition (Fig. 1): mean (st. dev.) for Norm condition = 1.593 (1.06), for Hypothetical condition = 1.259 (1.05), Mann–Whitney test, $p < 0.001$. Consistent with Prediction 2a, the difference was significant only for the younger age group: Younger Norm = 1.340 (1.08), Hypothetical = 0.816 (1.03), Mann–Whitney test, $p < 0.001$; Older Norm = 1.789 (1.00), Hypothetical = 1.697 (.886), Mann–Whitney test, $p = 0.455$. In summary, the condition manipulation worked as expected. Children in the Norm condition gave more to the other child in the DG compared to the children in the Hypothetical condition. The difference in actual donations decreased with age as children in both conditions gave more and gave closer to 50% of the stake.

Our main predictions concerned the relationship between children's stated and actual donations in the two conditions in relation to children's self-regulation. Given the relatively low proportion of children in the borderline and abnormal

³ Additional tests for each year of age are included in Appendix.

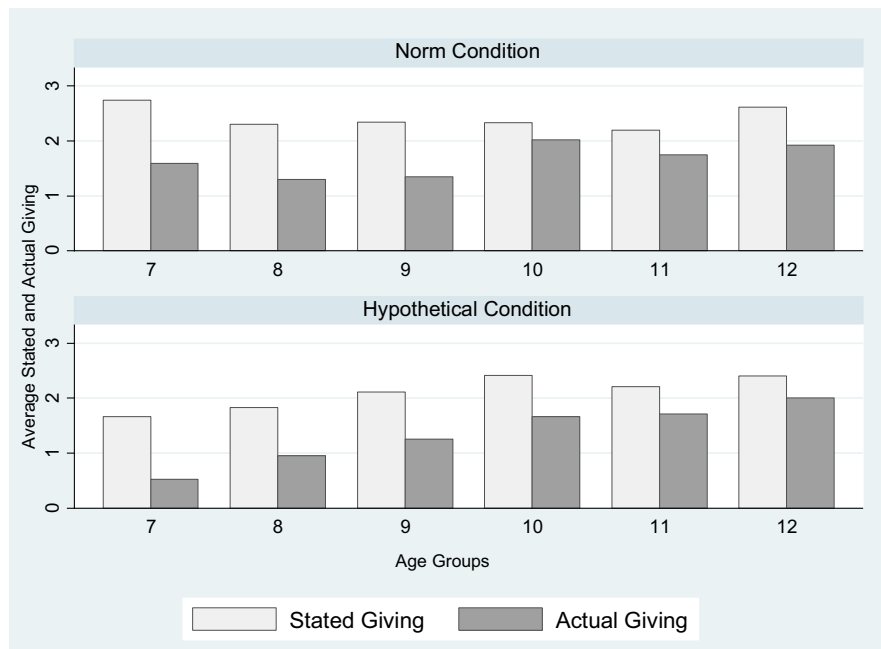


Fig. 1. Mean stated and actual donations for the Norm and Hypothetical conditions by year of age.

Table 2

Mann–Whitney tests for Normal versus Poor Self-regulation groups by condition and by age.

		Norm condition			Hypothetical condition		
		Stated	Actual	Difference Score	Stated	Actual	Difference Score
Self-regulation contrasts for all ages combined							
Normal versus Poor Self-regulation		$z = 0.424$ $p = 0.6712$	$z = 3.050$ $p = 0.0023$	$z = 1.647$ $p = 0.0996$	$z = 1.201$ $p = 0.2299$	$z = 0.171$ $p = 0.8646$	$z = 1.917$ $p = 0.0553$
Self-regulation contrasts by age group							
Old	Normal versus Poor Self-regulation	$z = 1.245$ $p = 0.2133$	$z = 2.694$ $p = 0.0071$	$z = 2.545$ $p = 0.0109$	$z = 0.514$ $p = 0.6070$	$z = 0.309$ $p = 0.7576$	$z = 1.582$ $p = 0.1136$
Young	Normal versus Poor Self-regulation	$z = 1.866$ $p = 0.0620$	$z = 1.749$ $p = 0.0803$	$z = 0.527$ $p = 0.5980$	$z = 0.898$ $p = 0.3691$	$z = 0.128$ $p = 0.8980$	$z = 1.302$ $p = 0.1930$

categories for self-regulation in our sample, we used a median split to create two Self-regulation groups: Normal (scores of 3 or lower) and Poor (scores >3). To examine the “gap” between stated donations and actual donations, we created a Difference Score (stated minus actual donation). The Difference Score variable had a possible range of -4 to 4 and was reasonably normally distributed; censoring was not evident in either tail.⁴ For the Norm condition, we predicted that children with Normal Self-regulation would give at levels closer to what they stated they should give and thus have smaller Difference Scores compared to children with Poor Self-regulation (3). Non-parametric tests confirmed this prediction (Fig. 2 and Table 2). For all ages combined, children in the Normal Self-regulation group had smaller Difference Scores compared to the Poor Self-regulation group (Mann–Whitney test, $p = 0.099$). In line with our predictions (3a), stated norms of giving did not differ for the two self-regulation groups (Mann–Whitney test, $p = 0.67$). Rather, children with Normal Self-regulation gave more compared to children with Poor Self-regulation (Mann–Whitney test, $p < 0.01$) (3b).

The results for the Hypothetical condition were contrary to our predictions (3c). Children with Normal Self-regulation gave closer to the amounts they said they would give compared to children with Poor Self-regulation (Mann–Whitney test, $p = 0.055$). However, this effect appeared only for the Difference Score for all ages combined. There were no significant differences between the Normal and Poor Self-regulation groups for either stated giving or actual giving. Moreover, there were no significant differences between these groups for stated, actual or Difference Scores when examining the younger and older age groups separately (Table 2).

⁴ See Appendix for full distribution of values for Stated, Actual and Difference scores.



Fig. 2. Means for stated and actual donations in the Norm and Hypothetical groups by age group and by self-regulation group. Children with low Self-regulation scores are in the typical/normal half of the distribution.

Prediction 4 pertained to the Norm condition only. Comparing the Normal and Poor self-regulation groups by age revealed that older children in the Normal group had smaller Difference Scores, as predicted. Older children in the Normal Self-regulation group both gave more (Mann–Whitney test, $p < 0.01$) and gave closer to the stated amount (Mann–Whitney test, $p = 0.011$) compared to older children in the Poor Self-regulation group (stated donations did not differ, Mann–Whitney test, $p = 0.213$). For younger children, self-regulation level did not influence children’s ability to give amounts closer to the stated amount (for Difference Score comparison, Mann–Whitney test, $p = 0.598$). To summarize, with age, children with normal self-regulation skills closed the gap between what they said they should give and what they actually gave, but children with poorer self-regulation did not (Fig. 2). This change was driven by higher actual giving among older children with normal self-regulation.

Regression models were used to confirm the effects of self-regulation and age on children’s ability to give closer to the stated amounts in each condition (the Difference Score). Given that children were tested in five different schools and in 27 different classrooms, we compared baseline multi-level models to intercept-only models. A multi-level model with random intercepts for classroom but not school provided the best fit.⁵ Variables of interest included a dummy variable for Condition (Norm = 0, Hypothetical = 1) and two covariates: Age (in months) and Self-regulation. Consistent with the non-parametric analyses, the best fitting model showed an interaction between Condition and Self-regulation. Subsequent analyses were done on each condition separately.

For the Norm condition, Age, Self-regulation, and the interaction of Age and Self-regulation were significant (Table 3, M7). The difference between what children said one should give and what they actually gave decreased with age. In addition, for older children, better self-regulation predicted a smaller difference between stated and actual amount. To this base model, we assessed the impact of nine additional variables one at a time: dummy variables for Any Siblings, Younger Siblings and Older Siblings; Number of Siblings; Gender; Combined Parent Education; Marital Status; Allowance; and Parent Perception of School Performance. Of these variables, only Older Siblings and Number of Siblings were significant, although these were collinear. Number of Siblings had a larger impact on the $-2LL$ estimate and was added to the final model (Table 3, M8). In sum, the regression model confirmed the results of the non-parametric tests. Older children with normal self-regulation closed the gap between what they said they should give and what they actually gave, but children with poorer self-regulation did not. In addition, children with more siblings were better able to close the gap.

For the Hypothetical condition, regression models were again constructed starting with Age (in months) and Self-regulation. Age was the only significant predictor, $p = 0.062$ (Table 4, M9). The difference between what children said they would give and what they actually gave decreased with age. Self-regulation did not affect this difference at any age. To this

⁵ Details of the regression analyses and additional models treating schools and classrooms as fixed effects are included in Appendix.

Table 3

Multilevel regression models for Norm condition with random intercepts for classroom and with Difference Score as the dependent variable, Coeff. (SE).

	M5	M6	M7	M8
Intercept	3.026 (0.87) ^{***}	2.821 (0.86) ^{**}	5.148 (1.30) ^{***}	5.183 (1.28) ^{***}
Age (months)	−0.0 (0.01) ^{**}	0.020 (0.01) ^{**}	−0.040 (0.01) ^{***}	−0.037 (0.01) ^{***}
Self-regulation		0.069 (0.04) [*]	−0.605 (0.29) [*]	−0.536 (0.28) [*]
Age × Selfreg			0.006 (0.00) [*]	0.005 (0.00) [*]
# Siblings				−0.329 (0.11) ^{**}
−2LL	−397.27	−395.69	−392.87	−388.33
# Obs	236	236	236	236
# Groups	14	14	14	14

⁺ $p < 0.1$.
^{*} $p < 0.05$.
^{**} $p < 0.01$.
^{***} $p < 0.001$.

Table 4

Multilevel regression models for Hypothetical condition with random intercepts for classroom and with Difference Score as the dependent variable, Coeff. (SE).

	M9	M10	M11
Intercept	2.090 (0.69) ^{**}	2.253 (0.70) ^{**}	2.685 (1.06) [*]
Age (months)	−0.011 (0.01) [*]	−0.011 (0.01) [*]	−0.015 (0.01) [*]
Self-regulation		−0.046 (0.04)	−0.187 (0.26)
Age × Selfreg			0.001 (0.00)
−2LL	−311.39	−310.76	−310.60
# Obs	197	197	197
# Groups	13	13	13

⁺ $p < 0.1$.
^{*} $p < 0.05$.
^{**} $p < 0.01$.

Table 5

Correlation matrix for questions in Self-regulation scale in the Norm condition. An R after the item indicates that it is reverse coded.

	Should	Actual	Age
Restless, overactive	−0.029	−0.123 ⁺	−0.002
Constantly fidgeting	−0.096	−0.107 ⁺	0.059
Easily distracted	−0.089	−0.120 ⁺	0.088
Thinks before acting (R)	−0.011	0.185 ^{**}	0.080
Sees tasks through, good attention span (R)	−0.046	0.169 ^{**}	0.030

⁺ $p < 0.1$.
^{**} $p < 0.01$.

base model, we added the same nine additional variables as above, one at a time. None of those variables was significant. In sum, with age, children gave close to what they said they would give, but self-regulation did not affect this process.

Our final predictions (5 and 5a) concerned the Norm condition only, and the particular roles of attention and inhibition in children’s ability to close the gap between what they should give and what they actually gave. For a preliminary assessment, we examined the correlations between the five questions of the Self-regulation scale and children’s stated norm (should), actual donations, and age in months (Table 5). None of the questions showed significant correlations with children’s stated norm – what they should give – or with age. By contrast, all of the questions were at least marginally correlated with what children actually gave (all $ps < 0.1$).

To evaluate whether the individual questions predicted the difference between what children said they should give and what they actually gave in the Norm condition, we used multi-level regression models with Difference Score as the dependent variable. We added all five questions along with the interactions with age and then removed non-significant variables one at a time to create a reduced model (Table 6).⁶ Two questions and their interactions with age were significant: one of the inhibitory control questions (Q10 – Constantly fidgeting or squirming) and one of the attentional control questions (Q25 – Good attention span, sees work through to the end). In sum, children who scored better on these questions gave closer to what they said they should give and this ability to follow the norm emerged with age. Based on this analysis of the particular questions in the Self-regulation scale, both inhibition and attention made separate contributions to explaining how some children were able to close the gap between their stated norms of giving and their actual donations.

⁶ The full model appears in Appendix.

Table 6

Multi-level regression, reduced model with Age in months and two questions as predictors of Difference Score: Q10, Inhibition – Constantly fidgeting, squirming; and Q25, Attention – Good attention span, sees work through to end.

	Coeff. (SE)
Intercept	1.607 (1.54)
Age (months)	–0.004 (0.01)
Q10, Inhibition	–1.867 (0.89) [*]
Q25, Attention	1.926 (1.02) [*]
Q10 × Age	0.016 (0.01) [*]
Q25 × Age	–0.019 (0.01) [*]
–2LL	–389.48
# Obs	236
# Groups	14

⁺ $p < 0.1$.
^{*} $p < 0.05$.

5. Discussion

The current experiment assessed the effects of different aspects of self-regulation on children’s ability to follow a stated norm about altruistic giving. Three key findings emerged. First, the gap between what children said one *should* give and what they *actually* gave in a DG decreased with age, replicating prior findings (Smith et al., 2013). Interestingly, this change was moderated by individual differences in children’s self-regulation as measured by the Self-regulation scale of the SDQ. Specifically, results suggested that children with normal self-regulation closed the gap with age, giving the same amount (or close to the same) as they said one should give by 11 years of age. By contrast, children with poor self-regulation increased their giving with age, but did not close the gap by 11. The relationship between self-regulation and change with age was specific to the norm condition in which children were asked what one should give and was not found when children are asked what they would give. Thus, the effect appeared only when children were primed to think about the norm for giving. This lends support to our hypothesis that self-regulation plays an important role in translating prosocial norms into action.

Second, the particular questions on the Self-regulation scale provide insight into which psychological processes enable children to follow norms of giving. Scores on the individual questions were not significantly related to age – i.e., older children did not score higher on particular items such as “thinking before acting.” Rather, children who possessed a greater ability to think before acting and follow through on a plan tended to give closer to the stated norm with age. However, only two questions, one assessing inhibition and one assessing attention were relevant for children’s ability to close the gap with age.

Third, the number of siblings a child had also predicted a smaller gap between children’s stated norms and what they actually gave. This effect applied specifically to older siblings. The more older siblings children had, the more likely they were to follow the norm for giving. One possible explanation for this effect is that children with older siblings have had more opportunities to engage in allocations and learned to abide by the norms. This experience could lead children to internalize prosocial norms which they then apply to novel circumstances such as the Dictator Game.

One question raised by these results concerns what exactly changes with age that enables children to close the gap between norms and giving. Given that children’s self-regulation abilities appear to remain stable with age,⁷ why do children with normal self-regulation only begin to follow the norms when they get older? Our data does not allow us to answer this question, but one plausible explanation implicates a sense of obligation to follow the norm. It is possible that children with better self-regulation skills feel the obligation to follow the norm at a younger age than children with poor self-regulation. If this proposal is correct, then we would expect to see children with poor self-regulation begin to follow the norm later than 12 or so years of age. The fact that even children with poor self-regulation gave more with age provides some indication that this kind of change occurs.

One limitation of the current study is that we used parental report and not a direct measure to assess self-regulation. Reaction time tasks are arguably better for inhibitory control and have already been shown to predict giving in Dictator Games (Aguilar-Pardo et al., 2013; Piovesan and Wengström, 2009). The Self-regulation scale in the current study showed similar effects for inhibition on actual giving but also included measures of attention that proved important. Two advantages of the self-regulation subscale of the SDQ are (1) that all of these dimensions of self-regulation are measured in a similar fashion: via parent-report; and (2) the SDQ is a standardized, well-validated measure that has been shown to predict both behavioral and educational outcomes. However, future research should explore more direct measures of planning and following in order to replicate and validate the current results.

⁷ This is a topic of much debate in developmental psychology. Researchers who use the effortful control framework tend to view some aspects of self-regulation as traits that reflect stable temperaments.

5.1. Implications for education

Educational programs that seek to create positive environments for learning emphasize the importance of establishing prosocial norms in the classroom. One problem educators may face is that not all children follow prosocial norms. The current findings provide an empirical basis for understanding this problem. This study suggests that, at least for norms of prosocial giving, children recognize that the same norm applies in a given situation. Moreover, individual differences are relevant for encouraging children to follow prosocial norms. Children who possess skills for holding the norm in mind and following through on a plan to behave according to the norm, become better at enacting the norm with age. Given that these skills themselves do not appear to change with age, interventions can target this strong self-regulation group and encourage them to follow the norms at younger ages. By contrast, children who lack these skills do not become better at following prosocial norms with age and may require different intervention strategies. The current study also identified a simple parent questionnaire which can be used to assess these individual differences. The short, 25 question Strengths and Difficulties Questionnaire can be used to identify children who will have the most trouble following prosocial norms in the classroom.

Acknowledgements

We thank the parents, schools, teachers and children of the Treviso school districts in Italy for their help and participation in this project. We gratefully acknowledge the financial support of Harvard Business School. PRB also thanks the John Templeton Foundation FQEB Fellowship for funding that supported this research.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.jebo.2014.10.004>.

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