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Brief Report

Altruistic self-regulation in young children

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ABSTRACT

We investigated whether children would be willing to sustain delaying their own gratification in order to benefit someone else. We used a modified version of the classic "marshmallow task," in which children must sustain delaying gratification in the presence of the immediate reward for an unspecified amount of time in order to receive a larger reward later. Children were assigned to one of three conditions. In the Self condition, children were given a food item and were told that if they waited to eat it, they would receive a second food item. In the Prosocial condition, children also were given a food item but were told that if they waited to eat their food item, another child would get a food item. In the Nonsocial Control condition, children were given a food item but were told that waiting to eat it would not benefit anyone. We found that children waited significantly longer in both the Self and Prosocial conditions than in the Nonsocial Control condition, and children's wait durations in the Self and Prosocial conditions were not significantly different. Our results suggest that children are willing to engage in effortful self-regulation in order to benefit another child.

Introduction

Delaying gratification requires children to forego an immediately available reward in order to receive a more preferable reward in the future (Mischel, Shoda, & Rodriguez, 1989). Supporting the

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ability to delay gratification is children's capacity for self-regulation; children must inhibit their desire to act on an immediate reward to achieve a more favorable outcome later (Baumeister, Heatherton, & Tice, 1994; Mischel & Metzner, 1962). Research has identified factors that influence children's motivation to engage in self-regulation, including the perceived certainty of a future payout (e.g., Kidd, Palmeri, & Aslin, 2013; Harris & Madden, 2002; Michaelson, de la Vega, Chatham, & Munakata, 2013; Michaelson & Munakata, 2016; Mischel, 1961; Mischel & Ebbesen, 1970). This work suggests that children engage in rational decision making about when to trade off immediate gratification and self-regulation to achieve the highest value reward.

Another potential motivating factor in engaging in self-regulation is the desire to benefit someone *else*. From an early age, children prefer equitable distributions of resources (Fehr, Bernhard, & Rockenbach, 2008; Sloane, Baillargeon, & Premack, 2012), reject unequal distributions even when they themselves benefit (Blake & McAuliffe, 2011), and behave in ways that benefit others (Blake et al., 2015; McAuliffe, Blake, Steinbeis, & Warneken, 2017; Warneken & Tomasello, 2006). Children may consider prosocial outcomes when making decisions about the costs and benefits of delaying gratification.

Indeed, there is evidence to suggest that children may be willing to defer a reward if doing so will benefit someone else. Thompson, Barresi, and Moore (1997) told 3- to 5-year-olds that they could either choose to receive a sticker now (immediate reward) or choose to have the sticker placed in an envelope for them to use later (delayed reward). On some trials, children were told that choosing the delayed reward would result in the research assistant also receiving stickers. By 5 years of age, children were willing to forego an immediate sticker to benefit the research assistant (see also Moore, 2009; Paulus & Moore, 2014, 2015).

Children also show a willingness to defer a reward in purely altruistic scenarios. Liu, Gonzalez, & Warneken, 2017 told children that they could either earn an immediate sticker reward or choose to wait for a specified duration (0–90 s) and earn a larger reward. Liu et al. manipulated whether the children were earning stickers for themselves or for another child. Children were willing to choose to wait in both conditions, but they were more likely to choose to wait when presented with a longer delay if they were earning stickers for themselves.

These studies suggest that children's willingness to forego an immediate reward may be influenced by prosocial considerations. Notably, in these previous studies, children were not required to *sustain* self-regulation in the face of an immediate reward. Specifically, on each trial, children made a decision to defer or not to defer, and once the decision was made, they were not given the opportunity to change their mind. This contrasts with tasks that require children to continually resist an immediately available reward for an unspecified period of time while they wait for a better reward (i.e., the "marshmallow task"; Mischel & Metzner, 1962). In these tasks, the cost of waiting increases with each passing moment, and therefore children must sustain the delay in the presence of the immediate reward and in the face of uncertainty (Berns, Laibson, & Loewenstein, 2007; Loewenstein, O'Donoghue, & Rabin, 2003; McGuire & Kable, 2012, 2013). Sustained self-regulation, thus, reflects dynamic decision making under uncertainty (McGuire & Kable, 2012) and requires children to continually calibrate their decisions based on continually changing costs and benefits of waiting.

Are prosocial considerations incorporated into children's decisions about how long to sustain delaying gratification? In one modification of the marshmallow task, Lewittes and Israel (1978) told children that they could either have a less preferred food now or wait (for an unspecified duration of time) and receive both the less preferred food and a more preferable food later. Some of the children were told that if they waited, another child also would receive a food item. The authors found that children waited longer when waiting also benefitted another child, suggesting that prosocial motivations, above and beyond the promise of a greater reward, could potentially influence children's ability to sustain self-regulation under temporal uncertainty. Yet it is currently unknown whether children would take purely altruistic outcomes under consideration in their decisions about when and how long to delay gratification. In the absence of a potential benefit for themselves, will children engage in sustained effortful self-regulation?

In the current study, we investigated whether children would sustain delaying gratification to benefit another child. Our aim was to gain further insights into both the factors that influence children's delay of gratification under uncertainty and how altruistic motivations influence children's behaviors

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and decisions. We modified the classic marshmallow task, assigning children to one of three conditions. In the Self condition, children were given a food item and were told that waiting to eat it would result in an additional food item for themselves, similar to classic sustained delay of gratification tasks (e.g., Kidd et al., 2013; Mischel et al., 1989; Shoda, Mischel, & Peake, 1990). In the Prosocial condition, children were told that waiting to eat their food item would result in an additional food item for *another child*. In this condition, waiting represented a purely altruistic choice because children themselves did not benefit from waiting. In the Nonsocial Control condition, children were told that waiting would result in an additional food item being put in another box (and not eaten), thereby benefitting no one. We examined the effect of these manipulations on the amount of time children were willing to wait as a measure of their sustained self-regulation.

Method

Participants

Participants were 72 4- and 5-year-old children (mean age = 4.87 years, range = 4.04–5.98; 38 girls; see online supplementary material for further demographic information). An additional 23 children were tested but excluded from analysis due to parental interference ($n = 3$), failing the comprehension criteria ($n = 3$), showing visible distress during the waiting period ($n = 10$), experimenter error ($n = 3$), having prior knowledge about or having participated in a similar task previously ($n = 3$), or the experimenter choosing to end the session early because the child was playing with the cameras ($n = 1$). Children were recruited from the greater Boston area in the northeastern United States and received a small gift for their participation.

Participants were assigned to one of three conditions: Self ($n = 24$), Prosocial ($n = 24$), or Nonsocial Control ($n = 24$) (between-participants design). Sample size was determined prior to data collection (see supplementary material for details).

Materials

Materials consisted of food items (marshmallows, gluten-free chocolate sandwich cookies, graham crackers, and pretzels), a $5 \times 5 \times 3$-in. clear plastic container with a red lid, a $6 \times 2.5 \times 2.5$-in. white cardboard box, and a 6-inch-diameter white paper plate. Before the study began, parents were given a list of potential food items to be used in the study and were asked to select, without asking their children, one food they thought their children would prefer. This food was then used in the delay of gratification task.

Because the ability to regulate emotions has been shown to influence the ability to delay gratification (Casey et al., 2011; Tice, Bratslavsky, & Baumeister, 2001), we asked parents to complete the Emotion Regulation Questionnaire (ERQ; Shields & Cicchetti, 1997). Parents rated how often their children exhibit a range of behaviors and emotional states on a scale from 1 (*never*) to 4 (*always*). Relevant sample items included "throws tantrums" and "is impulsive."

Procedure

Children were seated at a child-sized table across from the experimenter in a quiet laboratory testing room. The experimenter first showed children the clear plastic container holding two food items.

Instructions

In the Self condition, the experimenter told children, "Okay, now I'm going to make a deal with you. I have to leave the room right now. I'm placing one [food item] in front of you now." The experimenter then removed one of the two food items from the plastic container and placed it on a paper plate directly in front of children. She then told children, "If you wait to eat this [food item] until I come back into the room by myself, you can have *this* [food item] and I'll give you another [food item] to eat once I come back. But if you eat this [food item] before I come back into the room, I won't give you another [food item]."

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In the Prosocial condition, the experimenter first told children, "I'm going to tell you about someone. Her name is Jessie, and she's another kid like you who's going to come into the lab *later*." Pronouns were gender-matched to participants. The experimenter then placed the white box on the table and placed a food item in front of children. She told children that if they waited to eat their food item until she got back, she would put an additional food item in the box for Jessie to eat, but if they did not wait, she would leave the additional food item in its original box and Jessie would not get it.

The Nonsocial Control condition was constructed to be similar to the Prosocial condition in overall structure but without mention of another child. Children were told that if they waited to eat the food item, the experimenter would place the additional food item in the white box, but if they did not wait, the food item would stay in its original container. Children were told that in either case no one would eat the additional food item. See supplementary material for full scripts.

Thus, across the three conditions, children were told that waiting advances different benefits. In the Self condition, waiting benefits children themselves. In the Prosocial condition, waiting benefits someone else. In the Nonsocial Control condition, waiting benefits no one. These outcomes are summarized in Table 1.

To simplify the instructions, children were not told that they needed to summon the experimenter if they wanted to eat the food item (i.e., by ringing a bell; cf. Shoda et al., 1990). Instead, children could simply eat the food item before the experimenter returned (see Kidd et al., 2013, for a similar method). Crucially, children were not told how long the experimenter would be gone.

Comprehension questions

To ensure that children understood the instructions, children were asked what would happen if they waited for the experimenter to return and what would happen if they did not. A successful response reflected the relevant instructions (e.g., "Jessie will get a cookie"). If children did not know or did not answer correctly to one or both questions, the experimenter repeated the relevant instruction and asked the comprehension question again. We set the maximum number of repetitions of the instructions to three. The average number of repetitions was 0.72 for each question, and the number of repetitions was not different across the three conditions ["What will happen if you wait?": $F(2, 71) = 0.201$, $p = .819$; "What will happen if you don't wait?": $F(2, 71) = 0.453$, $p = .638$]. An additional 3 children who failed to respond correctly after three repetitions ($n = 1$ in the Self condition and $n = 2$ in the Nonsocial Control condition) were excluded from analyses.

Finally, the experimenter asked children whether they wanted to wait. The majority of children in both the Self (24/24 children) and Prosocial (21/24 children) conditions expressed that they wanted to wait (3 of 24 in the Prosocial condition said they did not want to wait). Interestingly, a majority of children in the Nonsocial Control condition also expressed their desire to wait (18/24 children; 4 of 24 said they did not want to wait and 2 of 24 said they did not know) despite correctly acknowledging that no one would benefit from their waiting. There was no difference between the conditions in the number of children who expressed wanting to wait (Kruskall–Wallis $H(2) = 4.406$, $p = .11$).

Waiting period

The experimenter then left the room and closed the door. Cameras in the testing room provided a secure live-stream video in a different section of the lab so that the experimenter could discretely observe participants throughout the study. Parents were invited to view the session with the experimenter. Videos were recorded and later coded for wait time.

Table 1
Summary of benefits of waiting for the full duration for each condition.

	Benefit of waiting	
Condition	For self	For other
Self	+1 food item	–
Prosocial	+0 food items	+1 food item
Nonsocial control	+0 food items	–

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Coding

Two research assistants coded the videos to measure each participant's wait time. Measurement of the wait time began when the testing room door was closed completely and ended when the child ate or licked the food item, when the child opened the door, or after a period of 15 min (900 s) had elapsed and the experimenter returned to the room. Coders also noted whether or not the child waited until the experimenter returned before eating the food item. In five cases (four in the Self condition and one in the Prosocial condition) the experimenter accidentally returned a few seconds before the 900-s period had elapsed (1, 4, 15, 20, and 24 s early), and in one case (in the Prosocial condition) the experimenter erroneously returned after only 830 s had elapsed because she thought the child had licked the food item (closer inspection of the video later revealed that the child had only sniffed the food item). In all cases, we opted to include these children's actual wait times in seconds (e.g., 830 s) but also counted them as having waited until the experimenter returned. Agreement between the coders was high (mean difference between coders = 0.44 s, SD = 1.01). When coders' times were different, the first coder's times were used.

For the ERQ, we averaged parents' ratings for the 12-item emotion regulation subscale to obtain an emotion regulation score. Scores could range from 1 to 4, with higher scores reflecting stronger emotion regulation abilities.

Data are available at https://osf.io/p83nz/?view_only-9a13b67410f347f4880bbe01f12dd559.

Results

Children's wait times (in seconds) deviated from normal in the Self condition, so we conducted nonparametric analyses on children's wait times. A Kruskal–Wallis test on children's wait times (in seconds) with condition (Self, Prosocial, or Nonsocial Control) as a between-participants factor revealed a significant effect of condition, $H(2) = 11.055$, $p = .004$. Children's wait times were significantly shorter in the Nonsocial Control condition[1] compared with both the Prosocial condition, Mann–Whitney U test, $z = -2.371$, $p = .018$, and the Self condition, $z = -3.101$, $p = .002$. There was no significant difference in children's wait times between the Self and Prosocial conditions, $z = -1.077$, $p = .281$ (see Fig. 1).

To examine whether condition effects on children's wait times could be due to differences in children's emotion regulation abilities, we submitted parents' ratings on the emotion regulation subscale of the ERQ to an analysis of variance (ANOVA) with condition (Self, Prosocial, or Nonsocial Control) as a between-participants factor. We found no main effect of condition, $F(2, 72) = 2.003$, $p = .143$, $\eta_p^2 = .055$, suggesting that children's emotion regulation abilities were roughly equivalent across the three conditions. Children's wait times also did not correlate with their emotion regulation scores ($r = .139$, $p = .243$). See supplementary material for ERQ means and standard deviations.

Finally, we looked at the number of children who waited the full duration. We found that 16 of 24 children (66.7%) in the Self condition, 11 of 24 children (45.8%) in the Prosocial condition, and 5 of 24 children (20.8%) in the Nonsocial Control condition waited the entire duration, Kruskall–Wallis $H(2) = 10.095$, $p = .006$. More children waited the full duration in the Self condition than in the Nonsocial Control condition (Fisher's exact test, $p = .003$), but there was no difference between the Self and Prosocial conditions ($p = .244$) or between the Prosocial and Nonsocial Control conditions ($p = .124$).

Discussion

We asked whether children would engage in sustained self-regulation in order to benefit someone else. Children were presented with a rewarding food item and told that waiting to eat it would result in either another food item for themselves (Self condition), a food item for someone else (Prosocial condition), or no additional food items (Nonsocial Control condition). We found that children waited

[1] Note that children in the Nonsocial Control condition waited despite passing comprehension checks that there would be no benefit to doing so. These children may have believed that the experimenter wanted them to wait because waiting was emphasized in the instructions. Nevertheless, this motivation was not as strong as the potential for earning an additional food item for themselves or someone else.

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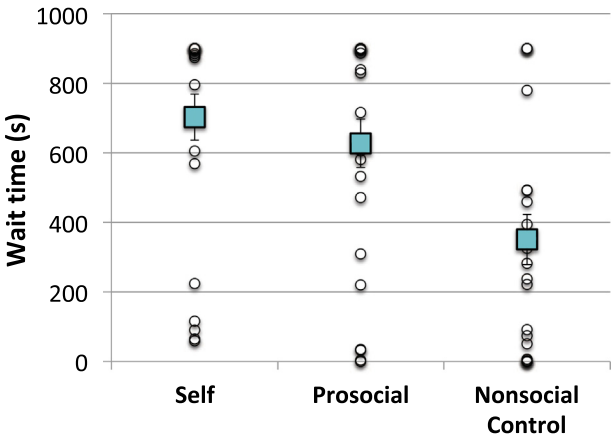

Fig. 1. Children's wait times (in seconds) for the Self, Prosocial, and Nonsocial Control conditions. Squares show the condition means (error bars are ±1 standard error of the mean). Circles show the individual wait times for each child (n = 24/condition). The maximum wait duration was 900 s.

significantly longer in both the Prosocial and Self conditions than in the Nonsocial Control condition, but we found no statistical difference in children's wait durations between the Prosocial and Self conditions. These results suggest that children incorporate both self- and other-benefitting outcomes into their decisions to sustain delaying gratification.

This research contributes to our understanding of altruistic behavior in children and converges with previous work showing that children are willing to forego an immediately available reward when there is a prosocial benefit for doing so (e.g., (Lewittes & Israel, 1978; Liu, Gonzalez, & Warneken, 2017; Moore, 2009; Thompson, Barresi, & Moore, 1997)). Furthermore, this work contributes to a growing body of literature illuminating the factors supporting sustained effortful self-regulation during childhood (e.g., Kidd et al., 2013; Michaelson & Munakata, 2016); our results suggest that altruistic considerations factor into children's calibrations of the costs and benefits of delaying gratification under temporal uncertainty.

Although the current study demonstrates that children can sustain self-regulation in altruistic scenarios, children's motivations for doing so remain unclear. Children may have been motivated by generosity (Cowell et al., 2017) or to derive happiness from the act of generosity (e.g., Paulus & Moore, 2015, 2017). Children also could have been motivated by a desire for fairness (e.g., Fehr et al., 2008; Engelmann & Tomasello, 2019) and may have waited in the Prosocial condition to prevent an unequal distribution of resources (Shaw & Olson, 2012). It is also possible that children could have been motivated by reputational concerns (e.g., Engelmann & Rapp, 2018; Shaw et al., 2014). Although children were not told that they would meet the child whom they had the opportunity to benefit, children nevertheless may have believed that behaving prosocially toward that child would enhance their reputation, whereas failing to benefit that child would harm their reputation. Further work is needed to examine the specific motivations behind children's willingness to wait to benefit someone else.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jecp.2019.104700.

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