

**CHILDREN'S SAVING: EFFECTS OF PROMPTING, AGE, AND INTERNAL AND
EXTERNAL FACTORS**

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Abstract

Although saving plays an important role in our everyday lives, including the lives of children, we know little about how this capacity develops, including the factors affecting it and the most effective means to measure it. This study examines the impact of age, a verbal prompt to save, and how internal (children's inhibitory control, impulsivity, attentional focus) and external factors (household income, parents' level of education, parents' saving practices with their child, and parents' beliefs about the importance of saving) influence both children's saving in a novel laboratory saving task and parent-reported saving. 187 children between 3 to 7 years of age participated in this study. In the laboratory saving task, which was based on the saving task by Metcalf and Atance (2011), children received tokens that they could exchange for a less desirable reward now, or save for a highly desirable reward three minutes later. Children were assigned to either the "prompt" or baseline condition. Children in the baseline condition only received basic instructions for completing the task, whereas children in the prompt condition received the additional reminder, before beginning the task, that they could save if they wanted to. Parent-reported saving was assessed with a questionnaire, asking parents about their child's saving at home. The internal and external factors were also measured using questionnaires completed by parents. Results show that assigned condition was associated with whether or not children saved ("saving status"), and that higher inhibitory control and parents' saving practices predicted increased parent-reported saving. These results show that internal and external factors impact children's saving behaviour and provides a new paradigm for assessing saving in young children. Implications for future research and limitations are discussed.

Keywords: child saving behaviours, internal factors, external factors, parent-reported saving, saving tasks, future-oriented behaviour

Children's Saving: Effects of Age, Prompting, and Internal and External Factors

Saving is a highly adaptive aspect of human behavior that occurs at many levels within a population. For example, governments engage in saving when rationing food during shortages, community groups save money gathered in a fundraising event, adults save when they create retirement savings accounts, and even children save when they keep a special treat for later or choose to bring home a drawing made at school earlier that day. Until recently, research on saving has almost exclusively focused on the economic saving practices of adults and the factors that may lead to increased financial savings. These include planning how money will be used by setting explicit intentions to save (e.g., Rabinovich & Webley, 2007), employing habitual saving practices (e.g., Allom et al., 2018), and considering the future self in relation to the present self (e.g., Bryan & Hershfield, 2012; Ersner-Hershfield, et al., 2009). Although saving plays an important role in our everyday lives, including the lives of children, we know little about how this capacity develops, including the factors affecting it and the most effective means to measure it. Expanding our knowledge of this topic is the overarching objective of this study. To accomplish this, we examine how age and providing children with a verbal prompt to save influence children's saving in a novel experimental saving task. We also examined how internal (children's inhibitory control, impulsivity, attentional focus) and external factors (household income, parents' level of education, parents' saving practices with their child, and parents' beliefs about the importance of saving) influence both children's saving in the task and their saving at home, as reported by their parents.

The Development of Saving

Developmental psychologists have contributed to our understanding of saving by exploring its emergence and the factors that affect its development. With respect to the former,

Otto et al. (2006) developed a “saving game,” in which 6-, 9-, and 12-year-olds received tokens that they could spend on a small reward during the game or save to spend on a larger reward after the game. Saving increased significantly with age, with 12-year-olds saving more tokens for the larger reward than 6-year-olds. More recently, researchers have developed behavioral measures of saving for even younger children. This research has been fueled by the finding that the capacity to think about the future (i.e., episodic future thinking) develops substantially between ages 3 and 5 (e.g., Atance, 2015; Atance et al. 2015; Suddendorf, 2017) and, so too, may saving. This is because saving requires acting now in anticipation of a later point in time (e.g., “save now for later”).

Metcalf and Atance (2011) developed a marble paradigm to measure saving behaviour in preschoolers. Three-, 4-, and 5-year-olds received three marbles which they could use in a small marble game now (housed in one room) or that they could save to use in a larger, more desirable, marble game later (housed in a second room). Children were shown how to use the marbles and were told they would first have access to the room that contained the small game and, only afterward, to the room that contained the larger, more desirable, game. Importantly, children were shown that once they put a marble down either of the marble games, it went into a closed box at the bottom and could not be retrieved, thus creating a context in which marbles were a limited resource. After children learned about both marble games, they were told that they would first spend 3 min in the room with the small game, followed by 3 min in the room with the large game. It was stressed to children that they only had three marbles for both games and thus they needed to decide how to allot their marbles. Saving was measured by the number of marbles children kept for use in the larger game. Overall, children saved very little (on average only one marble or less) and saving did not differ significantly as a function of age.

In a subsequent study, Atance et al. (2017) tested the hypothesis that saving rates in Metcalf and Atance (2011) were low because the possibility of saving simply did not occur to children. Accordingly, Atance et al. (2017) implemented a condition in which children were given a verbal prompt to save (“If you want to, you can use all of your marbles in the red (blue) room [for the small game], or you can save some marbles for the blue (red) room [for the larger game]” p. 72) and compared this “prompted” condition to an “unprompted” condition (similar to Metcalf & Atance, 2011). Children in the prompted condition saved significantly more marbles than children who did not receive the prompt. Moreover, in contrast to the null effect of age in Metcalf and Atance (2011), the mean number of marbles saved in this study improved significantly with age but was still relatively low (3-year-olds = 0.69; 4-year-olds = 1.07; 5-year-olds = 1.68; of a possible total of five marbles). Age did not significantly interact with condition, suggesting that all three age groups equally benefitted from the verbal prompt.

To further explore the kinds of manipulations that might improve children’s saving, Kamawar et al. (2019) adapted Metcalf and Atance’s (2011) paradigm to assess the role of “budgeting” in 3- to 6-year-olds. Children in the budgeting condition needed to decide in advance how many marbles they planned to use in two marble games (small and large), whereas children in the control condition simply received the basic instructions. Children who budgeted more saved more, but saving did not increase with age.

Together, these studies suggest that saving can be effectively measured in very young children and that it is influenced by future-oriented statements and actions, including verbal prompts and planning by budgeting. The findings, however, are more mixed about whether saving develops significantly between ages 3 and 6. Whereas Atance et al. (2017) found age-related changes in saving, Metcalf and Atance (2011) and Kamawar et al. (2019) did not.

More recently, Mazachowsky and Mahy (2020) developed the “Children’s Future Thinking Questionnaire” (CFTQ), a parent-report measure of children’s future-oriented cognition and behaviour, including their saving behaviour, prospective memory, episodic foresight, planning, and delay of gratification. Their inclusion of saving behaviour is particularly noteworthy, as their questionnaire is the first to directly examine the saving behaviour of younger children, as reported by parents. They began with a 79-item questionnaire and then refined it to 44 items. In their final study with the refined measure, parents of 3- to 7-year-old children completed the 44-item questionnaire, which included nine items pertaining to saving. Each item consisted of a statement to which parents indicated their level of agreement using a Likert scale (e.g., “Saves items for a time when he or she might be bored...”; Mazachowsky & Mahy, 2020; p.771). The parent-reported saving scores were then compared to the children’s performance in a behavioural saving task completed in the lab. In this task, children played a game using tokens which they could redeem immediately for a small toy (e.g., sticker) or save for a larger toy (e.g., plush toy) later. This comparison of home-based and lab-based measures of saving is important for providing potential evidence for the ecological validity of the laboratory task and for providing a different perspective on the same behaviour. Indeed, Mazachowsky and Mahy (2020) ultimately found that scores for the saving subscale were significantly positively related to performance on the behavioural task. Furthermore, scores for both improved significantly with age. Altogether, their new questionnaire and results illustrate how using multiple measures of saving provides valuable information on how this behaviour manifests across different settings, leading to more comprehensive and generalizable findings.

Factors that Influence the Development of Saving

Internal Factors

Research with preschoolers has also examined cognitive factors – including inhibitory control, working memory, and theory of mind – that may be associated with children's saving. This is because there is important conceptual overlap between these factors and saving. Inhibitory control (IC) develops during the preschool years (e.g., Carlson, 2005) and is defined as “the ability to inhibit responses to irrelevant stimuli while pursuing a cognitively represented goal” (Carlson & Moses, 2001, p. 1033). In this sense, there is similarity between IC and the decision required in saving to wait and forego a present reward in order to receive a more desirable reward later. In adults, IC (sometimes broadly defined as “self-control”) has also been shown to influence saving, where lower IC is associated with ineffective saving practices and increased financial debt (e.g., Allom et al., 2018; Vohs & Faber, 2007). A study with 9- to 11-year-olds also found higher rates of saving to be positively related with self-reported self-control (Trzcinska et al., 2018).

However, other studies have not found these meaningful associations with saving. Atance et al. (2017) administered two measures of IC, along with their saving paradigm, and found no significant association between the two. Kamawar et al. (2019) also failed to find a significant association between children's saving and their performance on a Delay of Gratification – Delay Choice – task (i.e., choosing between fewer stickers now versus more stickers later). These mixed findings suggest that IC is not associated significantly with saving or, given the significant results with adults and older children, it may only have an impact on saving later in development, when IC and other cognitive functions are more fully developed.

Working memory (WM) is conceptualized as “a brain system that provides temporary storage and manipulation of the information necessary for such complex cognitive tasks as language comprehension, learning, and reasoning” (Baddeley, 1992, p. 556), and may similarly be involved in saving. Specifically, the decision-making process involved in saving requires individuals to shift their attention from present thoughts and circumstances to possible future ones, which may utilize WM abilities (e.g., Ballinger et al., 2011). Attentional focus is one specific component of WM that has been shown to have a positive influence on saving in adults, measured in a laboratory task (e.g., Ballinger et al., 2011). Indeed, the importance of attentional focus is strongly associated with overall WM abilities, both in children (e.g., Magimairaj et al., 2013) and adults (e.g., Mallett & Lewis-Peacock, 2018). Atance et al. (2017) also measured the relation between working memory and performance on their marble saving task but, again, failed to find a significant association.

Theory of mind (ToM) is defined as the capacity to understand the mental states of others, which include beliefs, intentions, and desires (Wellman et al., 2001) and this begins to develop between the ages of 3 to 5 years. Whereas saving does not entail understanding the mental states of *others*, it involves imagining and understanding one's *own* future mental states and could thus conceivably require a certain degree of ToM ability. However, both Atance et al. (2017) and Metcalf and Atance (2011) administered ToM tasks (false belief, in particular) alongside their saving task, but failed to find any significant associations.

Altogether, these findings are quite varied and demonstrate a need for further investigation. They provide evidence that both supports and further questions the role of these internal factors in young children's saving behaviour. Consequently, the current study includes measures of the most relevant ones. Given that IC, specifically, may be important for saving in

older children and adults, we further explore this construct (along with impulsivity), as well as attentional focus, in the current study using the Children's Behavior Questionnaire (CBQ; Putnam & Rothbart, 2006). This parent-report measure is appropriate and well-validated with these factors and this age group (Putnam & Rothbart, 2006). Moreover, because the current study was run in a museum setting, it needed to be short and thus asking parents to complete a questionnaire while their child participated in the saving task was the most feasible approach to measuring our internal factors of interest.

External Factors

Saving is also likely affected by what we might call "external" factors (as opposed to the "internal"/cognitive factors just discussed), including household income, parents' level of education, parents' saving practices with their child, and parents' beliefs about the importance of saving. The positive role of higher socioeconomic status, which includes income and parents' education, on children's cognitive development is well-established (e.g., Jacobsen et al., 2017; Noble et al., 2015). The term "income" can be broadly defined as the total income of the combined household for a given year or another period (Statistics Canada, 2017c), and parents' level of education (i.e., their "educational attainment") refers to their highest diploma (e.g., college, high school), certificate (e.g., trades), or degree (e.g., university) (Statistics Canada, 2016b). The most common examples of saving behaviour in this context focus on economic saving practices among adolescents and adults with their parents.

For example, using data from a longitudinal Dutch panel study, Webley and Nyhus (2006) found a positive association between an adolescent's household income and their own financial savings as adults. Similarly, Agnew (2018) found the financial savings of 14- to 15-year-olds to be greater when living in a higher socioeconomic area. This may suggest that having

more available resources, may provide more opportunities to practice saving, which may result in stronger saving abilities. They also found that parents with higher levels of education were viewed more strongly as role models by their children (Agnew, 2018), which may cause these children to place greater value on their parents' advice and direction, leading to increased saving.

Parents' saving practices with their child and parents' beliefs about the importance of saving have also been shown to have a significant impact on their children's saving behaviours. While there are no studies with younger children, there are several relevant studies with older children and adolescents with their parents. For example, Agnew (2018) examined whether 14- to 15-year-olds' saving intentions, impulsive spending, knowledge of finance, and perceptions of their parents as role models, were predicted by their discussions about finance with their parents, having a bank account, or receiving an allowance. They found that the financial discussions had the most significant positive impact on the degree to which their child saved, as well as strengthening their view of their parents as role models and scoring higher on a financial literacy test. Webley and Nyhus (2006) also found that the types of financial decisions made by 16- to 21-year-olds closely resembled those of their parents. Webley and Nyhus (2013) further examined discussions about finances when they asked 18- to 32-year-olds about their saving experiences with their parents when they were 8- to 12-years-old. These experiences included how economical their parents were, if they discussed financial decisions, and if they were given, earned, or saved money. Results indicated that children whose parents engaged in these practices and encouraged them to save for the future had significantly greater financial savings as adults, in comparison to children of parents who were low in these areas. Similarly, Bucciol and Veronesi (2014) asked 18- to 80-year-olds to participate in a largescale household survey about similar experiences (to those asked by Webley & Nyhus, 20013) with their parents when they

were 8- to 16-years-old. These researchers found that children with parents who taught them about effective saving practices now saved more as adults.

While these findings are promising and demonstrate a connection between parent and child saving behaviour, they do not address whether such a connection might also exist in younger children. We addressed this in the current study by giving parents a demographic questionnaire to obtain information on their annual household income and their level of education. We also asked parents questions about their saving practices with their child and their beliefs about the importance of saving.

The Current Study

The purpose of the current study was to examine the factors that may influence the development of saving behaviour in young children. This age group has received limited attention leaving many questions about the development of saving unanswered, and especially the factors that impact it. While research with adults demonstrates a connection between cognitive abilities and saving (e.g., Allom et al., 2018; Ballinger et al., 2011), Atance et al. (2017) and Kamawar et al. (2019) did not find such a connection. The effects of age are similarly mixed, with only Atance et al. (2017) reporting age-related improvement. External factors including parents' level of education seem to positively impact saving in adolescents with these effects carrying over into adulthood (e.g., Agnew, 2018), but this research is limited by its strong economic focus and older age groups. Research with adults tends to measure saving based on accrued financial resources, with adolescent research providing more differentiation by often distinguishing between the source of money being saved (e.g., allowance, income from a part-time job, gifts, etc.) and where it is being saved (e.g., bank account, "piggy bank", etc.). Research with both of these groups heavily utilizes self-report questionnaires to measure saving,

while research with young children is limited to measuring their saving behaviour during a laboratory-based task (e.g., Atance et al., 2017; Kamawar et al., 2019; Metcalf & Atance, 2011). All of this points to four key areas that need to be further addressed: (1) age of participants; (2) internal factors; (3) external factors; and (4) how saving is measured.

The current study seeks to address these areas by including a broader age range of children between 3 and 7 years. Inhibitory control, impulsivity, and attentional focus are examined as internal factors that may influence children's saving behaviour, whereas income, parents' level of education, parents' saving practices with their children, and their beliefs in the importance of saving are examined as external factors that may influence children's saving behaviour. These were all measured using questionnaires completed by parents.

Saving was measured in two ways: (1) performance in a novel saving task; and (2) saving at home, as reported by children's parents. As stated previously, only one paradigm (the marble game) and its variants have been used to examine saving in young children. With only one measure, it is difficult to determine whether the observed saving behaviour is due to the specific measure or whether it is a broader reflection of children's capacity to save. In our new paradigm, children used tokens to "buy" less-preferred treats immediately or saved them to "buy" more-preferred treats later. Using tokens to "buy" treats is more reflective of saving in everyday life and may therefore also be more ecologically valid than using marbles. As was done in Atance et al. (2017) children were also divided into two conditions. In the first, children received basic instructions, whereas in the second, children received a verbal prompt alerting them that they could save if they wanted to. Consistent with Atance et al.'s (2017) findings, we hypothesized that children who received a verbal prompt would save more tokens and would more often decide to save at least one (versus none) token, compared to children who did not receive the

verbal prompt to save. We further hypothesized that saving would improve as age increased, also consistent with Atance et al. (2017) (see pre-registration document available on the Open Science Framework: Project Link: <https://osf.io/by7kt>).

For the second measure of saving, parents completed a questionnaire about their child's saving behaviour at home. We developed these questions independently for this study to reflect saving situations in the home. It is only after the completion of our study that we became aware of Mazachowsky and Mahy's (2020) parent-report questionnaire, which included questions on saving and that were significantly associated with performance in a saving task. This provides support for our inclusion of both types in the current study.

We also hypothesized that parent-reported saving would increase with age. Finally, based on the research described in previous sections, we hypothesized that higher levels of saving in both the lab task and as reported by parents would be positively related to increased inhibitory control and attentional focus, and negatively related to impulsivity. We also hypothesized that higher income, higher levels of parental education, using more saving practices, and having stronger beliefs about the importance of saving would be related to higher levels of saving in children.

Methods

Participants

Two hundred and twenty-four children between the ages of 36.00 and 95.80 months participated in this study. Twenty-four of these children were excluded because they did not complete the full study and a further 13 children (6.5%) were excluded because they did not show a preference for either stimulus option in the saving task. Because one of the purposes of the current study was to determine whether children would save their tokens for a more-desired

treat later versus a less-desired treat now, having a preference was required. The final sample thus included 187 children, who were each tested in English or French: 55 3-year-olds (24 females; $Mage = 41.99$ months, $SD = 3.73$; range = 36.01-47.80 months, English = 45), 37 4-year-olds (23 females; $Mage = 54.14$ months, $SD = 4.23$, range = 48.00-59.96 months, English = 32), 32 5-year-olds (21 females; $Mage = 66.17$ months, $SD = 3.79$, range = 60.00-71.82 months, English = 27), 39 6-year-olds (22 females; $Mage = 78.25$ months, $SD = 4.19$, range = 72.08-83.75 months, English = 32), and 24 7-year-olds (14 females; $Mage = 88.76$ months, $SD = 4.01$, range = 84.00-95.84 months, English = 16).

Children were all English and/or French speakers and were recruited while visiting a public science and technology museum in a large city. The majority of participants had English as their primary spoken language ($n = 105$, 56.1%), with a smaller number of participants having French ($n = 28$, 15%), both English and French ($n = 26$, 13.9%), or another combination of multiple languages ($n = 24$, 12.8%; four families/2.1% did not provide this information). The majority of participants were from middle- to upper-income families, with 126 (67.4%) declaring an annual household income of more than \$80,000, 27 (14.4%) an annual income of \$40,000-\$80,000, and 13 (7%) an annual income of less than \$40,000 (21 families/11.2% did not provide this information). Participants' legal guardians tended to be highly educated, with 89 (47.6%) reporting the completion of a postgraduate degree, 80 (42.8%) a university degree or college diploma, and 3 (1.6%) a high school diploma (15 families/8.0% did not provide this information). With regards to ethnic origins (e.g., Statistics Canada, 2017a; Statistics Canada, 2017d), our sample was predominately White with European ethnic origins ($n = 81$, 43.3%), but also included children with Asian ($n = 19$, 10.2%), Latin American ($n = 3$, 1.6%), North African and Arab ($n = 4$, 2.1%), Black and African ($n = 1$, 0.5%), and North American Aboriginal origins

($n = 1$, 0.5%), non-specific Canadian ($n = 23$, 12.3%), and other ($n = 2$, 1.1%). The remaining families did not provide this information ($n = 53$, 28.3%).

An a-priori power analysis was performed for sample size estimation, based on earlier, related findings that demonstrated a large effect size of condition (i.e., “baseline” vs “prompt”) in the lab-based saving task ($\eta^2 = 0.119$; Atance et al., 2017). The analysis showed that at least 62 participants, with 31 per condition of the saving paradigm, would be required for a two-tailed test with an effect size of $d = .735$ and 80% power. However, given the numerous secondary questions we wished to address (e.g., relation between saving and internal and external factors), we substantially increased our sample size and tested at the museum between January 2018 and January 2019. The number of participants per age group was comparable to that obtained by Atance et al. (2017) in which significant effects of age and condition (in the saving task) were detected.

Procedure

Upon their arrival to the museum lab, parents were explained the study and completed the consent form. Children were asked to provide assent, and they were then invited to play a game (i.e., the saving task) with the researcher. Children were randomly assigned to either the “baseline” or “prompt” condition of the saving task (see Table 1), which we describe in more detail below.

While the child completed this task (which took approximately 10 min), one parent/legal guardian completed a demographics form in which they provided information about their annual household income and level of education (see Appendix A). At this time, they also completed the questionnaire section for parent-reported saving (see Appendix B), the inhibitory control, impulsivity, and attentional focus scales from the short version of the Child Behavior

Questionnaire (Putnam & Rothbart, 2006; see Appendix C), and the questionnaire section for their own saving-related behaviours (see Appendix D). All procedures and questionnaires were available in both English and French.

Measures

Saving Paradigm

Testing was conducted in a sound-proofed laboratory room located within the museum. Experimenter (E) and child sat together at a table on which two rectangular trays were placed side by side (see Appendix E for the full experimental protocol). On each tray were one small square box with a slot in the lid and one paper cupcake liner. One of the trays (along with the box and cupcake liner) was blue and the other was green (see Figure 1). E introduced the task to children by saying: “You get to play two games today- one game on the green tray and one game on the blue tray”. E then proceeded to show children the stimuli by saying “I have two different treats for these games” and then placing one type of treat in each paper cupcake liner. E named each treat (i.e., “raisins” and “Smarties”) and also showed children the tokens.

E then introduced the games by stating: “This is the raisins game. It is on the green tray”, and then explaining how it works: “In this game, one token gets you one treat”. Then E demonstrated by using a token to get a treat and then asking the child to do the same: “Let me show you how it works. If I want a raisin, I have to put one token into this green box. Now I can eat one raisin. Now it is your turn to try”. The child then had the opportunity to eat one treat after which E reiterated the game’s rules: “Now remember, the rule is, once you put a token in the box you can’t take it out because it is all used up”. E then repeated the same instructions, but this time with the Smarties (i.e., the second game).

A “preference check” was then carried out to ensure the appropriate materials were being used in each task. The majority of participants were given raisins and Smarties ($n = 161$, 86.1%), however some children either could not have or did not like one or both of the treats, in which case they were given small round stickers to replace one food item, and both small and large stickers to replace both food items ($n = 25$, 13.3%). In one case a child used a food brought from home and selected it as their preferred item. Critical to our design was for each child to have one less-desired reward and one more-desired reward so that the child would have an incentive to save tokens for the second reward. For this reason, children who did not indicate a preference, by stating they liked neither or liked both equally, were excluded ($n = 13$, 6.5%).

Next, the child was informed that it was her turn and the E said: “First you will play the raisins game on the green tray for three minutes. After that you will play the Smarties game on the blue tray for three minutes”. After this the child was asked four memory check questions. The first two asked which game would be played first, and which game would be played second. The last two questions asked children to explain how they could get a treat (stimulus) in each game. E confirmed correct responses and corrected incorrect responses before continuing.

At this point children were told it was their turn and they were given five tokens and told that these were all the tokens they would get for both games. They were reminded that “One token gets you one treat, and once you put a token in the box you can’t take it out”. Next, E put the first game (raisins) on the table, set a timer for 3 min, and told children she would work while they played the game. At the end of the 3 min, the first game was put away and children were asked if they remembered which game, they would play next. If the child had remaining tokens, E put the second game (Smarties) on the table with the same instructions as she used when presenting the first game. If the child had no remaining tokens, the session was ended, and the

child was told they could not continue because they had no tokens left. Their score for saving in this task was the number of tokens they saved for their second/preferred treat.

Verbal Prompt. Materials and procedures for the prompt condition were identical to the baseline condition. The only difference was that a prompt was provided after children were given their five tokens and reminded that “One token gets you one treat, and once you put a token in the box you can’t take it out”. The prompt was “If you want to, you can use all of your tokens in the raisins game, or you can save some tokens for the Smarties game”.

Parental Report on Saving

Parents responded to 9 questions about children’s saving behaviour in the home (see Appendix B), using a Likert scale, each with 5 points ranging from “never” (=1) to “always” (=5). Their total score was calculated as the total sum of all the questions they answered, divided by the number of questions answered so they could be appropriately compared. This meant that possible scores ranged from 1-5, with unanswered items shown as missing (e.g., maximum score of 5 occurs when all 9 questions are answered, each with the maximum score of 5). Reliability for this measure of saving was good ($\alpha = .824$), and sufficient to proceed.

Internal and External Factors

Internal Factors. Parents were given three scales from the short version of the Child Behavior Questionnaire (Putnam & Rothbart, 2006) to assess their children’s attentional focus, inhibitory control, and impulsivity (see Appendix C). This measure consisted of 18 items measured on a 7-point Likert scale, ranging from “extremely untrue” to “extremely true”, so each item had a score of 1-7, but no score if it was left blank. Some items were reverse scored. There were 6 items for each internal factor, whose item values were summed and then divided by the number of questions answered, resulting in a range of possible scores from 1-7 not including

those who did not complete the measure. This was done separately for each section. It is important to note that higher scores for inhibitory control and attentional focus indicated stronger abilities in these areas, whereas lower scores for impulsivity indicated lower levels of impulsivity (see previously discussed hypotheses). Reliability was acceptable for the 6-item impulsivity scale ($\alpha = .747$), the 6-item attentional focus scale ($\alpha = .721$), and the 6-item inhibitory control scale ($\alpha = .632$), which was sufficient to proceed.

External Factors. Annual household income and parents' level of education were assessed via a demographic form (see Appendix A). For income, there were 6 options from which parents could select, ranging from "less than \$20,000" to "more than \$100,000", with scores from 1-6, where 6 is the highest amount and 1 is the lowest. For parents' level of education, they selected one of the following responses: "did not complete high school (score = 1); "high school degree" (score = 2); "college degree" (score = 3); "university degree" (score = 4); and "graduate degree" (score = 5), where a higher score indicated a higher level of education.

Parents responded to 3 questions about their saving practices with their children (see Appendix D), using the same Likert scale as used for parent-reported saving, with 5 points ranging from "never" (=1) to "always" (=5). Their total score was calculated as the total sum of all the questions they answered, divided by the number of questions answered so they could be appropriately compared. This meant that possible scores ranged from 1-5, with unanswered items shown as missing (e.g., maximum score of 5 occurs when all 3 questions are answered, each with the maximum score of 5). Parents' beliefs about the importance of saving were assessed in one item: "I think saving is important", with 5 response options from "completely disagree" (= 1) to "completely agree" (= 5) and their response on this item comprised their total score for this area.

Reliability was excellent for the 3-item scale on parents' saving practices with their child ($\alpha = .925$).

Results

Preliminary Analyses

One-way analysis of variance was used to compare the children in each condition (e.g., baseline and prompted) on key characteristics. Results showed that the groups did not significantly differ in their mean age in months, ethnic origins, annual household income, parental education level, scores for inhibitory control, impulsivity, and attentional focus, parent-reported saving, parents' saving practices with their child, and parents' beliefs about the importance of saving, and testing language (all $ps > .07$).

Means and standard deviations for all continuous variables can be found in Table 2, whereas all inter-variable correlations can be found in Table 3. The varying sample size reflects the fact that, while all participants completed the lab-based saving task, not all parents completed all parts of the questionnaires.

Main analyses

Effect of Condition on the Saving Task

An independent-samples t -test showed that children in the "prompt" condition ($n = 90$, $M = 1.78$, $SD = 1.71$) did not save significantly more tokens than children in the "baseline" condition ($n = 97$, $M = 1.36$, $SD = 1.72$), $t(185) = -1.57$, $p = .098$. In our next analysis, rather than examine saving as a continuous variable, children were identified as being "savers" (i.e., saved one or more tokens) or "non-savers" (i.e., saved no tokens). Using this "categorical" approach allowed us to differentiate between a child who engages in any amount of saving versus a child who does not save at all. We thus ran a chi-square test of independence to

determine whether the percentage of “savers” vs “non-savers” was independent of condition (i.e., baseline vs prompt). Results showed that there was a higher percentage of savers within the prompt condition (63.3%) than within the baseline condition (46.4%), and this effect was significant, $\chi^2(1) = 5.40, p = .02$ (see Figure 2).

Predictors of tokens saved

A series of linear regression analyses were conducted with all predictor variables (i.e., age in months, condition, and internal and external factors) to test the hypotheses regarding their influence on the number of tokens children saved. However, as can be seen in Table 4, none of the variables significantly predicted the number of tokens children saved.

A series of logistic regression analyses were carried out to determine if age in months, and internal and external factors predicted saving status - our dichotomous measure of saving. Condition had already proved to be significant, as reported in the previous section. All other predictors did not significantly predict saving status (see Table 6).

Predictors of parent-reported saving

Linear regression analyses were similarly conducted to test potential predictors of parent-reported saving. Two significant predictors, inhibitory control scores ($p < .05$) and the extent of parents' saving practices with their child ($p < .01$) were positively associated with levels of parent-reported saving. Thus, children who had better inhibitory control tended to engage in more saving behaviour at home (as reported by parents) than children with weaker inhibitory control. Parental saving practices were positively associated with higher parent-reported saving, showing that children whose parents more frequently discussed saving and strategies with them tended to engage in more saving behaviour at home (as reported by their parents).

Follow-up Bayesian Analyses

Bayesian analyses were conducted as a follow-up to the non-significant results of the previous analyses. Their purpose was to assess the strength of the evidence that the data provide for the null hypothesis. Increasing strength reflects the increasing likelihood that the null hypothesis is supported and that the non-significant results are not simply due to data insensitivity. In this way it is used to detect Type II error by assessing whether the null hypothesis was actually false and should have been rejected. Bayes factors were calculated for each non-significant analysis, comparing the fit of the data under the null hypothesis and the alternative hypothesis.

Effect of condition on saving

The results of the Bayesian *t*-test for condition as a predictor of the number of tokens saved ($BF_{01} = 1.74$) showed that the evidence supporting the null hypothesis is weak or anecdotal (e.g., criteria from: Jeffreys, 1961; Raftery, 1995; Wetzels et al., 2011), indicating insensitivity in the data (see Table 7). In other words, the data is insensitive for distinguishing between the two hypotheses and, while the alternative hypothesis was not supported in the original *t*-test, neither is there good evidence to support the null hypothesis.

Predictors of tokens saved

Bayesian linear regression analyses were used to test the strength of the evidence for the null hypothesis for the non-significant linear and logistic regression models (e.g., criteria from: Jeffreys, 1961; Raftery, 1995; Wetzels et al., 2011). The support for age in months, condition, income, and parents' beliefs about the importance of saving were considered as weak or anecdotal sources of evidence for the null hypothesis. However, parent education level, inhibitory control, impulsivity, attentional focus, parents' saving practices, and parent-reported

saving emerged as positive or substantial sources of evidence supporting the null hypothesis with some certainty (see Table 7).

The strength of the evidence for the null hypothesis for the non-significant logistic regression models for predicting saving status was tested using Bayesian linear regression analyses, as no logistic Bayesian analysis software is readily available. The same procedure and criteria were used (e.g., criteria from: Jeffreys, 1961; Raftery, 1995; Wetzels et al., 2011). The support for age in months, parent education level, children's inhibitory control, their attentional focus, parents' beliefs about the importance of saving, and parent-reported saving was positive or substantial, indicating the null hypothesis was supported with some certainty. Income, children's impulsivity, and parents' saving practices with their child were all weak or anecdotal sources of evidence (see Table 8).

Predictors of parent-reported saving

Bayesian linear regression analyses were used to assess the strength of the evidence for the null hypothesis for the non-significant linear regression models for parent-reported saving (e.g., criteria from: Jeffreys, 1961; Raftery, 1995; Wetzels et al., 2011). Results for age in months, impulsivity, and attentional focus scores were weak or anecdotal, but income, parent education level, beliefs about the importance of saving, and the number of tokens children saved in the lab-based task were positive or substantial sources of evidence supporting the null hypothesis and reducing the likelihood that the original results occurred due to insensitivity (see Table 9).

Discussion

The purpose of this study was to gain a better understanding of children's saving behaviour and the factors influencing its development using both experimental and parent-report

measures. With respect to the former, we developed a novel saving task in which children needed to save tokens to “purchase” their preferred treat. Within the context of this task, we also assessed whether providing children with a prompt to save would increase their saving as has been found in previous research (Atance et al., 2017). With respect to the latter, we developed a set of questions for parents that were designed to assess more “naturalistic” instances of children’s saving in their day-to-day lives.

Effect of condition (or “prompting”) on saving

In the experimental/lab-based saving task, the condition to which children were assigned was a key factor we wished to explore, given that Atance et al. (2017) showed that a verbal prompt significantly improved children’s saving. However, in the present study, we obtained mixed findings with respect to the verbal prompt/condition. We found that this effect was replicated when we looked at the association between condition and whether or not children saved (e.g., “saving status”), where the number of “savers” was higher within the prompted condition, which supports our original hypothesis and was consistent with earlier findings. However, subsequent analyses found no significant effect of the verbal prompt on the number of tokens children saved. Perhaps the best or most meaningful reflection of children’s saving is simply whether or not they save, as opposed to how *much* they save. This is because it is unclear in the context of this task what the optimal number of tokens to save may be. For example, is saving four tokens better than saving three? Or is the most important factor whether or not children save any? If the latter, then as just noted, perhaps this outcome measure is the most reflective of saving and the most likely variable to be impacted by the verbal prompt.

The novel design of our task may also have played a role in saving performance. There may be inherent differences due to an array of factors, such as the different materials (e.g.,

tokens and treats), setting (e.g., lab located in a public museum, though soundproof and isolated), and procedures (e.g., different wording and order in protocol). Further use of this task alongside other saving measures would allow for better comparison.

Effect of age on saving

Surprisingly, we did not find a significant effect of age either on children's saving in the lab-based task, nor on the parental report measure of saving. Developmentally, we would expect that older children would be "better" savers than younger children. Indeed, given that we tested a fairly broad age range (3 to 7 years) we predicted significant age effects, as found by Atance et al. (2017). However, it is possible that our measures of saving were not sensitive enough to detect statistically significant differences in saving between age groups, in which case a Type II error would have been made when genuine differences were missed (e.g., Heneghan & Brassey, 2019). The results of the Bayesian analyses showed that the evidence supporting the accuracy of the non-significant findings was at a low to moderate level, suggesting the results were biased by insensitive measures. Testing the reliability and validity of measures prior to beginning data collection, such as by administering the questionnaire to a large sample of parents and testing for age-related differences could provide helpful information for making changes that improve sensitivity.

Nonetheless our lack of age effect – at least on the lab-based task – is consistent with Metcalf and Atance (2011) who also did not find a significant effect of age on children's saving – though, it should be noted that they only tested 3- to 5-year-olds and not up to age 7. The mixed findings with respect to age in previous studies is in fact part of the reason that, in the current study, we sought to explore other factors that might explain some of the variance in children's saving. We turn to the effects of these "internal" and "external" factors next.

Effects of internal factors

A main goal of this study was to increase knowledge about the factors that impact children's saving behaviour. In this context, we examined inhibitory control, attentional focus, and impulsivity as internal factors that may influence saving. We had hypothesized that children who saved more in the lab-based saving task and who had higher parent-reported saving would also have higher inhibitory control and attentional focus, and lower impulsivity. This hypothesis received some support with inhibitory control being a significant predictor of parent-reported saving. Otherwise, none of the internal factors significantly predicted children's performance on the lab-based saving task, and neither attentional control nor impulsivity predicted parent-reported saving. These largely null findings are consistent with previous findings by Atance et al. (2017) and Kamawar et al. (2019), but conflict with some of the financial saving research with adults in which lower IC was associated with ineffective saving practices and increased financial debt (e.g., Allom et al., 2018; Vohs & Faber, 2007).

The effect of inhibitory control on parent-reported saving and not lab-based saving could be attributed to their design features. Most evidently, both the inhibitory control and parent-reported saving measures were questionnaires completed by parents, beginning with the parent-reported saving portion. It is possible that priming occurred, whereby parents who rated their child more highly in saving behaviours (item example: "My child has saved food and eaten it later or asked for it later), would be primed to continue rating their child highly in their level of inhibitory control. The difference between the questionnaires and the behavioural saving task in the lab may be of equal importance. The inhibitory control subscale asked parents about children's saving in their everyday life (e.g., "Prepares for trips and outings by planning..."; Putnam & Rothbart, 2006), whereas the lab saving task occurred in a controlled laboratory

setting where saving was measured as an isolated behaviour. This lowers the ecological validity of the lab-based task, whereas the practically relevant items in the questionnaires may increase it. As such, lab-based saving may not correspond to parent-report measures of saving or parents' saving practices.

Effects of external factors

We also investigated external factors that have previously been identified as being important for saving in research conducted with adolescents and adults (e.g., Agnew, 2018, Webley & Nyhus, 2006, etc.). While this research focused largely on the development of financial saving practices, we hypothesized that similar effects could be found in younger age groups in the context of saving other kinds of resources. Accordingly, we hypothesized that household income, parent education levels, and parents' beliefs about saving, and parents' saving practices would positively predict children's saving. While none of these variables significantly predicted children's saving in the lab task, parents' saving practices significantly predicted parent-reported saving.

These findings may be explained similarly to the previously discussed findings with inhibitory control. Since both measures were questionnaires completed by parents, they may have responded similarly. Just as was seen with inhibitory control, parents completed the parent-reported saving portion before the parent saving practices portion. As with inhibitory control, parents' responses to the parent saving practices items could be based on responses to the parent-reported saving questions. For example, a parent who rates their child high in saving skills may simply respond similarly throughout the questionnaire. Another possibility is that children with stronger saving abilities typically have parents or other primary caregivers that provide clear guidance and support in developing these skills. The absence of this effect on lab-based saving

could be due to the very different methods used in a lab-based task, compared to a questionnaire. As discussed with inhibitory control, the highly controlled context of the lab-based task contrasts with the practical wording of the parent questionnaires, where parents are asked about their everyday behaviours and interactions, instead of children being asked to demonstrate the behaviour in an artificial laboratory setting. This could contribute to the different results for the different measures of saving.

It is interesting that parental income and education did not significantly predict children's saving either in the lab or at home. However, it is important to keep in mind that these factors are quite "removed" from the child, whereas parents' saving practices occur directly within parent-child interactions. At the younger ages that we tested, it makes sense that these concrete and tangible interactions surrounding saving have a more detectable impact on saving than parental education and income. For example, parents may provide more direct instructions and strategies for saving thus "scaffolding" these behaviors which in turn make them more likely to occur and more likely that parents in our study reported them.

Limitations

There are at least three potential limitations of this study. A first limitation concerns the novelty of our lab-based saving task. We developed this task after careful consideration and examination of previous tasks (e.g., Atance et al., 2017; Kamawar et al., 2019; Metcalf & Atance, 2011). However, this was still a new idea and as such it will benefit from further refinement and replication to establish its use as a valid and reliable measure of young children's saving behaviour. A second limitation concerns the parent-report questionnaires, and specifically the parent-reported saving items, which were developed for this study. Although we had hoped that these items would be significantly correlated with children's lab-based saving - similarly to

what was recently found by Mazachowsky and Mahy (2020) – they were not. This begs the question of whether these measures are adequately tapping into children's saving. A third potential limitation is a lack of ethnic/cultural and socio-economic variability in our sample. The majority of participants were White and from high income households. This does not reflect the diversity of Canadian society, which limits the generalizability of our findings and also makes it difficult to detect effects of factors such as parental income on children's saving.

Implications and future directions

Despite these limitations, our results suggest several theoretical and practical implications. For example, we were able to develop a new measure for saving and our consideration of internal and external factors is a new approach to studying young children's saving behaviour. Future research can build on this approach and expand to include a wider range of abilities and factors.

Future research could also focus on the future orientation inherent in saving. While some work has been done on planning and budgeting (e.g., Kamawar et al., 2019), there is room to expand the scope to other aspects of future-oriented cognition, such as episodic foresight, delay of gratification, and prospective memory. The new measure of future-oriented cognition by Mazachowsky and Mahy (2020) would be a highly useful approach. Expanding on the questionnaires to include additional questions for parents' saving practices and parents' beliefs about saving could provide a richer source of information. Previous studies have asked specific questions about how children earn, acquire, and spend money. Research with young children could ask these questions (children are exposed to these concepts at a very young age), and extend to other kinds of saved resources, such as candy, stickers, toys, food, etc.

In addition, using multiple laboratory-based saving tasks for each participant could allow for comparison between methods to determine what is most effective for understanding saving behaviour in young children. All of these further steps could be taken with a specific age or age range, which would allow for an initial exploration of the possible age-related differences in saving behaviour. With younger children there are vast developmental differences within a matter of months, so future work could examine saving within a much smaller age range (e.g., 36-48 months) to detect minute changes that may have been missed in our broader age range. Conversely, future work could further expand the scope to gain a better developmental or lifespan perspective of saving. Cross-sectional and longitudinal saving studies have thus far looked at adolescents and adults, with a few inclusions of older children. An examination of saving from birth to older adulthood would be extremely valuable for all researchers who study people's saving behaviours.

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Table 1*Participants' condition by age in years.*

Age	Condition				Total	
	Baseline		Prompt		n	%
	n	%	n	%		
3	27	14.4	28	15	55	29.4
4	17	9.1	20	10.7	37	19.8
5	18	9.6	14	7.5	32	17.1
6	22	11.8	17	9.1	39	20.9
7	13	7	11	5.9	24	12.8
Total	97	51.9	90	48.1	187	100

Table 2*Means and standard deviations for continuous variables*

		N	Minimum	Maximum	Mean or most common	SD
Internal Factors	Age in months	187	36.01	95.84	62.1	17.23
	Inhibitory control (range = 1-7)	158	2.33	6.83	5.07	0.92
	Impulsivity (range = 1-7)	160	1.67	6.67	4.25	1.13
	Attentional focus (range = 1-7)	158	2	6.83	5.01	1.03
External Factors	Income	166	<\$20,000)	>\$100,000	\$80,000-100,000	n/a
	Parent education level	172	High school diploma	Postgraduate degree	University degree	n/a
	Parents' saving practices with their child (range = 1-5)	158	1	5	2.84	0.97
Saving Measures	Parents' beliefs about the importance of saving (range = 1-5)	156	1	5	4.71	.62
	Number of tokens saved in saving task (range = 0-5)	187	0	5	1.56	1.72
	Parent-reported saving (range = 1-5)	149	1.22	4.67	2.89	0.76

Table 3*Correlation matrix for continuous variables.*

	1	2	3	4	5	6	7	8	9	10
1. Age in months	1									
2. Income	-.055	1								
3. Parent education level	-.062	.364**	1							
4. Inhibitory control	.091	.049	.089	1						
5. Impulsivity	.042	.072	-.245**	-.424**	1					
6. Attentional focus	.054	.026	.153	.441**	-.289**	1				
7. Parents' saving practices with their child	-.200*	.070	-.102	.197*	-.025	.201*	1			
8. Parents' beliefs about the importance of saving	.079	.089	-.006	-.064	.092	.028	.104	1		
9. Number of tokens saved in task	-.025	.077	-.011	-.051	.019	-.015	.041	-.070	1	
10. Parent-reported saving	.105	.114	-.046	.322**	-.099	.192*	.581**	.031	-.071	1

*p < .05; **p < .01

Table 4*Results of linear regression analyses with predictor variables of the number of tokens saved*

Predictors	B	SE	95% C.I. for B		β	p
			Lower	Upper		
Age in months	-.008	.010	-.028	.011	-.085	.390
Condition	.534	.337	-.135	1.203	.152	.117
Internal Factors						
Inhibitory control	-.071	.240	-.547	.405	-.037	.768
Impulsivity	-.080	.177	-.431	.272	-.052	.654
Attentional focus	.041	.190	-.336	.418	.024	.830
External Factors						
Income	.276	.141	-.004	.557	.199	.053
Parent education level	-.101	.242	-.582	.379	-.043	.677
Parents' saving practices with their child	.163	.234	-.301	.626	.085	.488
Parents' beliefs about the importance of saving	-.382	.254	-.885	.121	-.145	.135
Saving Measures						
Parent-reported saving	-.226	.277	-.776	.324	-.097	.417

Table 5*Results of linear regression analyses with predictor variables of parent-reported saving*

Predictors	B	SE	95% C.I. for B		β	p
			Lower	Upper		
Age in months	-.001	.003	-.007	.006	-.015	.853
Internal Inhibitory control*	.189	.082	.027	.351	.233	.023*
Factors Impulsivity	.023	.062	-.100	.145	.035	.718
Attentional focus	-.015	.066	-.146	.116	-.021	.823
External Income	.021	.050	-.078	.119	.035	.678
Factors Parent education level	-.007	.085	-.174	.161	-.007	.938
Parents' saving Practices with their child*	.418	.071	.278	.558	.512	.001*
Parents' beliefs about the importance of saving	-.016	.089	-.193	.161	-.014	.856
Saving Measures Number of tokens saved in the saving task	-.028	.034	-.094	.039	-.065	.417

*p < .05

Table 6*Results of logistic regression analyses with all variables as predictors of saving status*

Predictors	B	S.E.	Wald Chi- square	95% C.I. for Wald		df	p	Exp(β)	95% C.I. for Exp(β)		
				Lower	Upper				Lower	Upper	
	Age in months	-.008	.012	.465	-.032	.015	1	.495	.992	.969	1.015
	Condition*	-.972	.422	5.324	-1.798	-.146	1	.021	.378	.166	.864
Internal Factors	Inhibitory control	-.025	.296	.007	-.605	.555	1	.932	.975	.546	1.741
	Impulsivity	-.268	.219	1.507	-.697	.160	1	.220	.765	.498	1.744
	Attentional focus	-.009	.238	.001	-.474	.457	1	.971	.991	.622	1.579
External Factors	Income	-.246	.178	1.922	-.594	.102	1	.166	.782	.552	1.107
	Parent education level	-.184	.301	.373	-.774	.406	1	.542	.832	.461	1.501
	Parents' saving Practices with their child	-.457	.301	2.295	-1.047	.134	1	.130	.633	.351	1.144
	Parents' beliefs about the importance of saving	.416	.311	1.785	-.194	1.026	1	.182	1.516	.824	2.789
Saving Measures	Parent-reported saving	.106	.353	.089	-.587	.798	1	.765	1.111	.556	2.221

*p < .05

Table 7

Results of Bayesian linear regression analyses with all variables as predictors of the number of tokens saved

	Models	P(M)	P(M data)	BF _M	BF ₀₁	R ²	Support for H ₀ (Raftery, 1995)
Internal Factors	Age in months	0.009	0.021	2.292	2.941	0.011	Weak
	Condition	0.009	0.031	3.441	1.979	0.018	Weak
	Inhibitory control	0.009	0.012	1.350	4.948	0.000	Positive
	Impulsivity	0.009	0.012	1.317	5.072	0.000	Positive
	Attentional focus	0.009	0.012	1.353	4.938	0.001	Positive
External Factors	Income	0.009	0.039	4.427	1.551	0.023	Weak
	Parent education level	0.009	0.012	1.318	5.070	0.000	Positive
	Parents' saving Practices with their child	0.009	0.012	1.330	5.021	0.000	Positive
	Parents' beliefs about the importance of saving	0.009	0.025	2.789	2.427	0.014	Weak
Saving Measures	Parent-reported saving	0.009	0.014	1.529	4.376	0.003	Positive

Table 8*Results of Bayesian linear regression analyses with all variables as predictors of saving status*

	Models	P(M)	P(M data)	BF _M	BF ₀₁	R ²	Support for H ₀ (Raftery, 1995)
Internal factors	Age in months	0.011	0.017	1.495	3.596	0.007	Positive
	Inhibitory control	0.011	0.012	1.056	5.068	.000	Positive
	Impulsivity	0.011	0.028	2.544	2.138	0.017	Weak
External Factors	Attentional focus	0.011	0.013	1.158	4.625	0.002	Positive
	Income	0.011	0.039	3.655	1.506	0.023	Weak
	Parent education level	0.011	0.012	1.102	4.857	0.001	Positive
	Parents' saving practices with their child	0.011	0.052	4.883	1.142	0.028	Weak
Saving Measures	Parents' beliefs about the importance of saving	0.011	0.015	1.327	4.046	0.004	Positive
	Parent-reported saving	0.011	0.016	1.415	3.797	0.006	Positive

Table 9

Results of Bayesian linear regression analyses with all variables as predictors of parent-reported saving

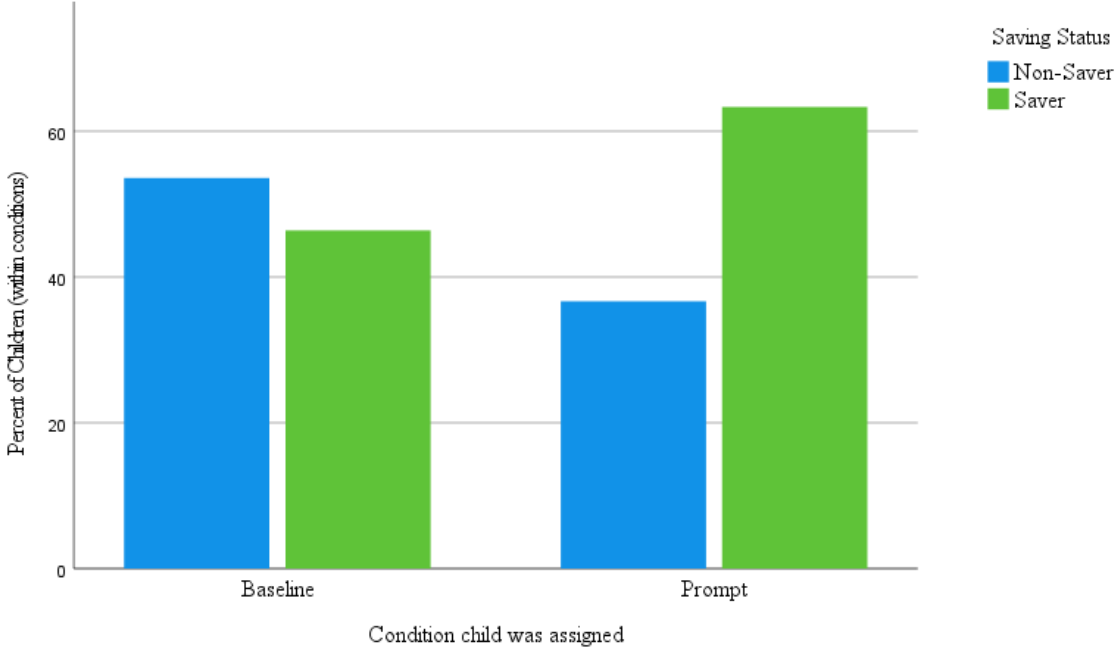
	Models	P(M)	P(M data)	BF _M	BF ₀₁	R ²	Support for H ₀ (Raftery, 1995)
Internal Factors	Age in months	0.018	0.033	1.865	1.917	0.018	Weak
	Impulsivity	0.018	0.033	1.892	1.890	0.019	Weak
	Attentional focus	0.018	0.078	4.656	0.806	0.034	Weak
External Factors	Income	0.018	0.020	1.098	3.214	0.009	Positive
	Parent education Level	0.018	0.014	0.809	4.340	0.003	Positive
Saving Measures	Parents' beliefs about the importance of saving	0.018	0.015	0.812	4.323	0.003	Positive
	Number of tokens saved in the saving task	0.018	0.016	0.903	3.891	0.005	Positive

Figure 1

Table showing blue and green trays, boxes, and cupcake liners, and the green chair where children were seated throughout the experiment.



Figure 2
Percentage of savers and non-savers within the baseline and prompt conditions



Appendix A
Demographic Questionnaire (English and French)

The academic journals to which we submit our research findings often ask us to report about various aspects of our sample of children, including their ethnicity, their parents' income, education, and profession, and the languages spoken inside and outside the home. However, these journals also recognize that it is not always possible to obtain this information from parents. Thus, while it is helpful to us if you provide this information in the form below, if you do not feel comfortable doing so, you are in no way obligated to do so. Please know that any information you provide will be kept strictly confidential.

Languages spoken with child:

First language: _____ Amount of exposure (hrs/day): _____ By whom? _____
 Language 2: _____ Amount of exposure (hrs/day): _____ By whom? _____
 Language 3: _____ Amount of exposure (hrs/day): _____ By whom? _____
 Language 4: _____ Amount of exposure (hrs/day): _____ By whom? _____

Child's ethnicity: _____

Annual household income: (Please circle one)

less than \$20,000	\$20,000-\$40,000	\$40,000-\$60,000
\$60,000-\$80,000	\$80,000-100,000	more than \$100,000

Education level and occupation of parents/guardians:

Please check highest level of education attained, and indicate any professional designations (e.g., MD, CPA, etc.) and type of occupation for each parent/guardian:

Parent/Guardian 1:

Relation to child: _____

Did not complete high school

High school degree

College degree

University degree

Graduate degree

Professional Designation: _____

Occupation: _____

Parent/Guardian 2

Relation to child: _____

Did not complete high school

High school degree

College degree

University degree

Graduate degree

Professional Designation: _____

Occupation: _____

Questionnaire démographique

Les revues scientifiques auxquelles nous soumettons nos résultats de recherche nous demandent souvent de rendre compte de divers aspects de notre échantillon d'enfants, y compris leur origine ethnique, le revenu, l'éducation et la profession de leurs parents, ainsi que les langues parlées. Cependant, ces revues reconnaissent également qu'il n'est pas toujours possible d'obtenir cette information auprès des parents. Ainsi, bien qu'il nous serait utile d'obtenir l'information ci-dessous si vous êtes prêt à la fournir, si vous ne vous sentez pas à l'aise de le faire, vous en êtes nullement obligé. Sachez que les informations que vous fournissez resteront strictement confidentielles.

Langues parlées:

Première langue: _____ Montant d'exposition (heures/jour): _____ Par qui? _____
 Langue 2: _____ Montant d'exposition (heures/jour): _____ Par qui? _____
 Langue 3: _____ Montant d'exposition (heures/jour): _____ Par qui? _____
 Langue 4: _____ Montant d'exposition (heures/jour): _____ Par qui? _____

Ethnicité de l'enfant : _____

Revenu annuel du ménage : (S'il vous plaît encercler une option)

moins de 20 000\$	20 000 \$-40 000\$	40 000 \$-60 000\$
60 000 \$-80 000\$	80 000 \$-100 000\$	plus de 100 000\$

Niveau d'éducation et profession des parents/tuteurs :

Veillez s'il vous plaît cocher le plus haut niveau de scolarité atteint et indiquer toutes les désignations professionnelles (par exemple, MD, CPA, etc.) et le type de profession pour chaque parent/tuteur :

Parent/Tutrice/Truteur 1:

Relation avec l'enfant : _____

N'a pas complété le secondaire

Diplôme d'études secondaires

Diplôme d'études collégiales

Diplôme d'études universitaires

Diplôme d'études supérieurs

Désignation professionnelle : _____

Occupation : _____

Parent/Tutrice/Tuteur 2 :

Relation avec l'enfant : _____

N'a pas complété le secondaire

Diplôme d'études secondaires

Diplôme d'études collégiales

Diplôme d'études universitaire

Diplôme d'études supérieurs

Désignation professionnelle : _____

Occupation : _____

Appendix B

Saving Behaviour Questionnaire: Children's saving with their parents at home

(English and French)

This questionnaire contains questions about your child's behaviour. Please answer the questions below according to the instructions provided in each section.

Section 1: My Child's Saving Behaviour

Please answer these questions about your child's saving behaviours within the past six months. Circle your answer.

1. While eating a meal, my child has saved room for dessert by eating less of the food on his/her plate.	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
2. My child has saved food and eaten it later or asked for it later.	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
3. My child is good at saving Halloween (or other) candy/treats.	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
4. My child has saved "special" toys to play with on a special occasion or with a particular person.	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
5. My child has saved "bits and pieces" (e.g., craft materials) of things for use during an activity later.	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
6. My child has saved an incomplete drawing or project to finish later.	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
7. My child has saved money to purchase an item later.	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
8. My child has chosen not to spend money on one item in order to save money to spend on another item.	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
9. My child has saved money for a specific event (e.g., trip, visit to an amusement park, etc.).	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER

Partie 1: L'aptitude de mon enfant à économiser

Veillez répondre aux questions suivantes sur l'aptitude de votre enfant à économiser dans les derniers six mois. *Encerclez votre réponse.*

1. Durant un repas, mon enfant a gardé de la place pour le dessert en mangeant moins de nourriture dans son assiette.				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
2. Mon enfant a mis de côté de la nourriture pour plus tard ou en a demandé pour plus tard.				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
3. Mon enfant est capable de conserver des friandises d'halloween ou autre.				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
4. Mon enfant a mis de côté des jouets auxquels il est attaché pour une occasion spéciale ou pour jouer avec une personne en particulier.				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
5. Mon enfant a mis de côté des morceaux d'items (ex. matériel de bricolage) pour les utiliser plus tard.				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
6. Mon enfant a mis de côté un dessin ou un projet incomplet pour le terminer plus tard.				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
7. Mon enfant a gardé de l'argent pour acheter un article plus tard.				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
8. Mon enfant a choisi de ne pas dépenser de l'argent pour un article de façon à le garder pour l'achat d'un autre article.				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAEMENT	JAMAIS
9. Mon enfant a mis de côté de l'argent pour un événement particulier (par exemple, un voyage, une visite à un parc d'amusement etc.).				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS

Appendix C

Behaviour Questionnaire

(English and French)

(CBQ; Putnam & Rothbart, 2006)

Section 2: My Child's Behaviour

On the next pages you will see a set of statements that describe children's reactions to a number of situations. We would like you to tell us what your child's reaction is likely to be in those situations. There are of course no "correct" ways of reacting; children differ widely in their reactions, and it is these differences we are trying to learn about. Please read each statement and decide whether it is a "true" or "untrue" description of your child's reaction within the past six months. Use the following scale to indicate how well a statement describes your child.

- | Circle # | If the statement is: |
|----------|--------------------------------------|
| 1 | extremely untrue of your child |
| 2 | quite untrue of your child |
| 3 | slightly untrue of your child |
| 4 | neither true nor false of your child |
| 5 | slightly true of your child |
| 6 | quite true of your child |
| 7 | extremely true of your child |

If you cannot answer one of the items because you have never seen the child in that situation, for example, if the statement is about the child's reaction to your singing and you have never sung to your child, then circle NA (not applicable).

Please be sure to circle a number or NA for every item.

1 extremely untrue	2 quite untrue	3 slightly untrue	4 neither true nor untrue	5 slightly true	6 quite true	7 extremely true	NA not applicable
--------------------------	----------------------	-------------------------	------------------------------------	-----------------------	-----------------	------------------------	-------------------------

My child:

1. Usually rushes into an activity without thinking about it. [impulsivity]							
1	2	3	4	5	6	7	NA
2. When practicing an activity, has a hard time keeping her/his mind on it. [attentional focus]							
1	2	3	4	5	6	7	NA
3. Will move from one task to another without completing any of them. [attentional focus]							
1	2	3	4	5	6	7	NA
4. Often rushes into new situations. [impulsivity]							
1	2	3	4	5	6	7	NA
5. Takes a long time in approaching new situations. [impulsivity]							
1	2	3	4	5	6	7	NA
6. Can wait before entering into new activities if s/he is asked to. [inhibitory control]							
1	2	3	4	5	6	7	NA
7. Is slow and unhurried in deciding what to do next. [impulsivity]							
1	2	3	4	5	6	7	NA
8. Prepares for trips and outings by planning things s/he will need. [inhibitory control]							
1	2	3	4	5	6	7	NA
9. Tends to say the first thing that comes to mind, without stopping to think about it. [impulsivity]							
1	2	3	4	5	6	7	NA
10. Has trouble sitting still when s/he is told to (at movies, church, etc.). [inhibitory control]							
1	2	3	4	5	6	7	NA
11. When drawing or coloring in a book, shows strong concentration. [attentional focus]							
1	2	3	4	5	6	7	NA
12. Is good at following instructions. [inhibitory control]							
1	2	3	4	5	6	7	NA
13. When building or putting something together, becomes very involved in what s/he is doing and works for long periods. [attentional focus]							
1	2	3	4	5	6	7	NA

14. Approaches places s/he has been told are dangerous slowly and cautiously. [inhibitory control]							
1	2	3	4	5	6	7	NA
15. Can easily stop an activity when s/he is told “no”. [inhibitory control]							
1	2	3	4	5	6	7	NA
16. Is among the last children to try out a new activity. [impulsivity]							
1	2	3	4	5	6	7	NA
17. Is easily distracted when listening to a story. [attentional focus]							
1	2	3	4	5	6	7	NA
18. Sometimes becomes absorbed in a picture book and looks at it for a long time. [attentional focus]							
1	2	3	4	5	6	7	NA

Partie 2: Questionnaire sur les comportements des enfants

Dans les prochaines pages, vous allez lire une série d'énoncés décrivant les réactions des enfants face à diverses situations. Nous aimerions que vous nous indiquiez la réaction probable de votre enfant dans ces situations. Bien entendu, il n'y a pas de bonne ou de mauvaise façon de réagir : les réactions varient grandement d'un enfant à l'autre, et ce sont ces différences que nous nous essayons d'étudier. Veuillez lire chaque énoncé et évaluer s'il s'agit d'une « vraie » ou d'une « fausse » description de votre enfant en tenant compte des six derniers mois seulement. Utilisez l'échelle suivante pour indiquer la véracité de chaque énoncé par rapport à votre enfant.

- Encerclez #** **Si l'énoncé est:**
- 1 extrêmement faux à propos de votre enfant
 - 2 assez faux à propos de votre enfant
 - 3 légèrement faux à propos de votre enfant
 - 4 ni vrai ni faux à propos de votre enfant
 - 5 légèrement vrai à propos de votre enfant
 - 6 assez vrai à propos de votre enfant
 - 7 extrêmement vrai à propos de votre enfant

Si vous ne pouvez répondre puisque vous n'avez jamais vu votre enfant dans cette situation (par exemple, si l'énoncé est à propos de la réaction de votre enfant quand vous lui chantez une chanson et que vous ne lui avez jamais chanté de chanson), encerclez NA (non applicable).

Veuillez-vous assurer d'avoir encerclé un nombre ou NA pour chacun des énoncés.

1	2	3	4	5	6	7	NA
extrêmement faux	assez faux	légèrement faux	ni vrai ni faux	légèrement vrai	assez vrai	extrêmement vrai	non applicable

Mon enfant:

1. Se lance habituellement dans une activité sans y avoir réfléchi. [impulsivity]							
1	2	3	4	5	6	7	NA
2. A de la difficulté à maintenir sa concentration lorsqu'il/elle fait une activité. [attentional focus]							
1	2	3	4	5	6	7	NA
3. Va de tâche en tâche sans en compléter une seule. [attentional focus]							
1	2	3	4	5	6	7	NA
4. Se précipite souvent dans de nouvelles situations. [impulsivity]							
1	2	3	4	5	6	7	NA
5. Prend beaucoup de temps pour approcher les nouvelles situations. [impulsivity]							
1	2	3	4	5	6	7	NA
6. Peut attendre avant de commencer de nouvelles activités si on lui demande. [inhibitory control]							
1	2	3	4	5	6	7	NA
7. Ne se presse pas pour décider quoi faire après une activité. [impulsivity]							
1	2	3	4	5	6	7	NA
8. Se prépare pour les voyages et les sorties en pensant aux choses dont il/elle aura besoin. [inhibitory control]							
1	2	3	4	5	6	7	NA
9. À tendance à dire la première chose qui lui vient à l'esprit, sans s'arrêter pour penser à ce qu'il/elle dit. [impulsivity]							
1	2	3	4	5	6	7	NA
10. A de la difficulté à demeurer assis(e) tranquille quand on lui demande (au cinéma, à l'église, etc.). [inhibitory control]							
1	2	3	4	5	6	7	NA
11. Montre une grande concentration lorsqu'il/elle dessine ou colore. [attentional focus]							
1	2	3	4	5	6	7	NA
12. Est bon(ne) pour suivre des instructions. [inhibitory control]							
1	2	3	4	5	6	7	NA

13. S'investit beaucoup et travaille sur de longues périodes lorsqu'il/elle construit ou assemble quelque chose. [attentional focus]							
1	2	3	4	5	6	7	NA
14. S'approche lentement et prudemment des endroits qu'on lui a dit dangereux. [inhibitory control]							
1	2	3	4	5	6	7	NA
15. Peut facilement s'arrêter de faire quelque chose lorsqu'on lui dit « non ». [inhibitory control]							
1	2	3	4	5	6	7	NA
16. Est parmi les derniers enfants à essayer une nouvelle activité. [impulsivity]							
1	2	3	4	5	6	7	NA
17. Est facilement distrait(e) lorsqu'il/elle écoute une histoire. [attentional focus]							
1	2	3	4	5	6	7	NA
18. Devient parfois absorbé(e) par un livre d'images et le regarde pendant un long moment. [attentional focus]							
1	2	3	4	5	6	7	NA

Appendix D

Saving Behaviour

(English and French)

Section 3: My Saving Behaviour*This question pertains to my saving behaviour within the past six months. Circle your answer.*

1. I discuss saving with my child. [parent saving practices]				
ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
2. I discuss the importance of saving with my child. [parent saving practices]				
ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
3. I discuss specific saving strategies with my child. [parent saving practices]				
ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
4. I think saving is important. [parent beliefs about the importance of saving]				
Completely Agree	Partially Agree	Neither Agree nor Disagree	Partially Disagree	Completely Disagree

Partie 3: Mon aptitude à économiser*Cette question concerne mon aptitude à économiser dans les derniers six mois. Encerlez votre réponse.*

1. Je discute de l'idée d'économiser avec mon enfant. [parent saving practices]				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
2. Je discute de l'importance d'économiser avec mon enfant. [parent saving practices]				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
3. Je discute avec mon enfant de stratégies pour économiser. [parent saving practices]				
TOUJOURS	SOUVENT	QUELQUEFOIS	RAREMENT	JAMAIS
4. Il est important pour moi d'économiser. [parent beliefs about the importance of saving]				
Tout à fait d'accord	Plutôt d'accord	Ni d'accord ou pas d'accord	Plutôt pas d'accord	Pas de tout d'accord

Appendix E

Experimental Protocol (English and French)

Introduction

- You are going to play two games today. One game on the green tray [*point to green tray*] and one game on the blue tray [*point to blue tray*].

Materials

What two materials are being used now? (<i>circle</i>)					
First:	Raisins	Smarties	Small Stickers	Large Stickers	Other: _____
Second:	Raisins	Smarties	Small Stickers	Large Stickers	Other: _____

Raisins and Smarties

- I have two different treats for these games.
- Do you know what these are called? [*Pour raisins into paper liner and point to raisins*]
 - **If "raisins" → That's right, these are raisins.*
 - **If other response → Actually, these are raisins. They are dried grapes.*
- Do you know what these are called? [*Pour raisins into paper liner and point to smarties*]
 - **If "smarties" → That's right, these are smarties.*
 - **If other response → Actually, these are smarties. They are chocolate candies.*
- Today, you are going to play the raisins game and the smarties game.

Tokens

- I have something else for these games. [*Show child four tokens*]
- Do you know what these are called? [*Point to tokens*]
 - **If "tokens" → That's right, these are called tokens*
 - **If other response → In this game, these are called tokens.*

Explanations

- Now, I'm going to show you the two games and then you will get your turn.

How to play raisins game

- This is the raisins game. It is on the green tray. [*Point to green tray*]
- In this game, one token gets you one treat.
- Let me show you how it works.
- If I want a raisin, I have to put one token into this green box. [*Put token in green box*]

- Now I can eat one raisin. *[Eat one raisin]*
- Now it is your turn to try. *[Give child one token to use for one raisin]*
- Now remember, the rule is, once you put a token in the box you can’t take it out because it is all used up.
- That is how you play the raisins game.

How to play smarties game

- This is the smarties game. It is on the blue tray. *[Point to blue tray]*
- In this game, one token gets you one treat.
- Let me show you how it works.
- If I want a smartie, I have to put one token into this blue box. *[Put token in blue box]*
- Now I can eat one smartie. *[Eat one smartie]*
- Now it is your turn to try. *[Give child one token to use for one smartie]*
- Now remember, the rule is, once you put a token in the box you can’t take it out because it is all used up.
- That is how you play the smarties game.

Preferences

Do you like raisins?	Yes	No		
Do you like smarties?	Yes	No		
Which one do you like more?	Raisins	Smarties	Both	Neither

Note: *If child states that they do not like one stimulus (e.g., raisins or smarties), ask them if they like another (e.g., small stickers or large stickers), and then repeat instructions with liked stimulus and indicate this was done below:*

Child did not like: _____
 Experimenter asked if child likes: _____
 Experimenter repeated instructions using new stimulus (*circle*): YES NO
 Child liked new stimulus (*circle*): YES NO
 Name of preferred stimulus: _____

Confirm task order

**Always present least-preferred stimulus (e.g., the one they like less) first*

**If they say that they like both, proceed with usual order of raisins first and smarties second*

**If they say they like neither, proceed with usual order of raisins first and smarties second*

Confirm task order by circling the stimulus used first (less preferred) and the stimulus used second (preferred):				
First stimulus:	Raisins	Smarties	Small Stickers	Large Stickers
Second stimulus:	Raisins	Smarties	Small Stickers	Large Stickers

➔ **Note:** For the rest of the protocol, assume that the term “raisins” refers to the less preferred stimulus and “smarties” refers to the preferred stimulus.

Explanations

- Now it is your turn.
- You get to play each game one time.
- First, you will play the raisins game on the green tray for three minutes. [*Point to green tray*]
- After that, you will play the smarties game on the blue tray for three minutes. [*Point to blue tray*]

Memory check

(Circle responses)

Question A

Okay, so which game do you get to play first?	Correct	Incorrect	Don't Know	No Answer
<p>*If “raisins/green” → That's right, you will get the green tray with the raisins game. *If “blue/smarties” → No, you will get the green tray with the raisins game. *If other response → You will get the green tray with the raisins game.</p>				
*If incorrect, repeat memory check question				
Okay, so which game do you get to play first?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue				

Question B

Okay, so which game do you get to play after that?	Correct	Incorrect	Don't Know	No Answer
<p>*If smarties/blue → That's right, after the raisins game, you will get the blue tray with the smarties game. *If green/raisins → No, after the raisins game, you will get the blue tray with the smarties game. *If I don't know → After the raisins game, you will get the blue tray with the smarties game</p>				
*If incorrect, repeat memory check question				
Okay, so which game do you get to play after that?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue.				

Question C

Now, how do you get a raisin in this game?	Correct	Incorrect	Don't Know	No Answer
<p>*If correct (e.g., put a token into the green box) → That's right, you put a token in the green box to get a raisin. *If incorrect response → No, you put a token in the green box to get a raisin. *If other response → You put a token in the green box to get a raisin.</p>				
*If incorrect, repeat memory check question				
Now, how do you get a raisin in this game?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue				

Question D

Now, how do you get a smartie in this game?	Correct	Incorrect	Don't Know	No Answer
*If correct (e.g., put a token into the blue box) → That's right, you put a token in the blue box to get a smartie.				
*If incorrect response → No, you put a token in the blue box to get a smartie.				
*If other response → You put a token in the blue box to get a smartie.				
*If incorrect, repeat memory check question				
Now, how do you get a smartie in this game?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue				

Instructions

- Now, it is your turn to play both games.
- I am giving you five tokens to use: one, two, three, four, five. [*Place tokens on table as you count them out loud*]
- These are all the tokens you get for both games.

Baseline condition

- Now, it is your turn to play both games.
- Remember, one token gets you one treat, and once you put a token in the box you can't take it out.

Prompt condition

- Now, it is your turn to play both games.
- Remember, one token gets you one treat, and once you put a token in the box you can't take it out.
- If you want to, you can use all of your tokens in the raisins game, or you can save some tokens for the smarties game.

Start raisins game

- Now it is time for the raisins game.
- I am going to put the smarties game away. [*Put blue tray with smarties out of sight*]
- My timer is set for three minutes. That is how long you get to play the raisins game.
- I am going to do some work over there while you play this game.
- Let's start right now. [*Turn away and pretend to work for three minutes*]

Verbalizing saving strategies before raisins task

Did child verbalize any saving strategies?	Yes	No
How many?		
Describe any saving strategies		

Observations for raisins game

**Continue game for 3 minutes and encourage child to wait until the time is over (e.g., there are two minutes left, we need to wait a little longer, etc.). If game is ended early, explain why and indicate the ending time on the table below.*

Time	# Tokens used	Attempts to retrieve token	Verbalizes saving strategy	Tries to eat treat without using token	Other verbal or behavioural observations (child or experimenter)
0:00-0:30					
0:30-1:00					
1:00-1:30					
1:30-2:00					
2:00-2:30					
2:30-3:00					

Number of tokens used in the raisins game: _____

Memory check

Okay, we are done playing the raisins game, do you remember what game you get to play now?	Correct	Incorrect	Don't Know	No Answer
<i>*If smarties/blue → That's right, now it's time for the blue tray with the smarties game. *If raisins/green → No, now it's time for the blue tray with the smarties game. *If I don't know → It's time for the blue tray with the smarties game.</i>				
<i>*If incorrect, repeat memory check question.</i>				
Okay, do you remember what game you get to play now?	Correct	Incorrect	Don't Know	No Answer
<i>*If incorrect again, correct and continue.</i>				

I am going to put the raisins game away. *[Put green tray with raisins out of sight]*

If child has tokens:

I am getting out the smarties game. *[Get out smarties tray and put on table]*

My timer is set for three minutes. That is how long you get to play the smarties game. I am going to do some work over there while you play this game. Let's start right now.

[Use observation table and end game after child has used all remaining tokens]

If child does not have any tokens:

Oh look, you do not have any tokens for the smarties game right now, so I want to ask you two questions.

Verbalizing saving strategies after raisins task and before smarties task

Did child verbalize any saving strategies? Yes No
How many?
Describe any saving strategies

Observations for smarties game

**Note: end game once child has used all tokens and indicate ending time on table below.*

Time	# Tokens used	Attempts to retrieve token	Verbalizes saving strategy	Tries to eat treat without using token	Other verbal or behavioural observations (child or experimenter)
0:00-0:30					
0:30-1:00					
1:00-1:30					
1:30-2:00					
2:00-2:30					
2:30-3:00					

Number of tokens used in the smarties game: _____

Verbalizing saving strategies after task 2

Did child verbalize any saving strategies? Yes No
How many?
Describe any saving strategies

Introduction des deux jeux

- Tu vas jouer à deux jeux aujourd'hui. Un jeu sur le plateau vert [*pointez le plateau vert*] et un jeu sur le plateau bleu [*pointer le plateau bleu*].

Matériaux:

Quels sont les deux matériaux que nous utilisons maintenant? (<i>encerclez</i>)			
Premier:	Raisins Sec	Smarties	Petits Collants Gros Collants
Autre: _____			
Deuxième:	Raisins Sec	Smarties	Petits Collants Gros Collants
Autre: _____			

Introduction aux matériaux

- J'ai deux friandises différentes pour ces jeux.
- Sais-tu comment ceci s'appelle ? [*Verser les raisins secs dans le moule en papier et pointez*]
 - *Si 'raisins secs' → C'est exact, ce sont des raisins secs
 - *Si autre réponse → En fait, ce sont des raisins secs. Ce sont des raisins séchés
- Sais-tu comment ceci s'appelle ? [*Verser les smarties dans le moule en papier et pointez*]
 - *Si 'Smarties' → C'est exact, ce sont des Smarties
 - *Si autre réponse → En fait, ce sont des Smarties. Ce sont des bonbons au chocolat.
- Donc aujourd'hui, nous allons jouer au jeu des raisins secs et au jeu des Smarties.

Jetons

- J'ai quelque chose d'autre pour ces jeux [*montrez deux jetons à l'enfant*]!
- Sais-tu comment ceci s'appelle ? [*Pointez les jetons*]
 - Si 'jetons' → C'est exact, ça s'appelle des jetons
 - *Si autre réponse → Dans ce jeu, ça s'appelle des jetons.

Explication

- Je vais te montrer les deux jeux et ensuite ce sera à ton tour.

Comment jouer aux jeux des raisins secs

- Voici le jeu des raisins secs. Le jeu des raisins secs est sur le plateau vert [*pointez le plateau vert*].
- Dans ce jeu, un jeton peut te donner une récompense.
- Je vais te montrer comment ça fonctionne
- Si je veux un raisin sec, alors je dois mettre un jeton dans cette boîte verte [*Metz le jeton dans la boîte verte*].
- Maintenant je peux manger le raisin sec ! [*Mangez le raisin sec*]
- Maintenant c'est à ton tour d'essayer. [*Donner à l'enfant un jeton à utiliser pour un raisin*]
- Mais souviens toi, le règlement est qu'une fois que tu as mis le jeton dans la boîte, on ne peut pas le sortir parce qu'il a été utilisé.

- C'est comme ça qu'on joue au jeu des raisins secs.

Comment jouer au jeu des Smarties

- Voici le jeu des Smarties. Le jeu des Smarties est sur le plateau bleu. [*pointez le plateau bleu*]
- Dans ce jeu, un jeton peut te donner une récompense.
- Je vais te montrer comment ça fonctionne
- Si je veux un Smartie, alors je dois mettre un jeton dans cette boîte bleu.
- Maintenant, je peux manger un Smartie.
- Maintenant c'est à ton tour d'essayer. [*Donner à l'enfant un jeton à utiliser pour un Smartie*]
- Mais souviens toi, le règlement est qu'une fois que tu as mis le jeton dans la boîte, on ne peut pas le sortir parce qu'il a été utilisé.
- C'est comme ça qu'on joue au jeu des Smarties.

Vérification de la désirabilité

[*Encerclez la réponse aux questions ci-dessous*]

Est-ce que tu aimes les raisins secs?	Oui	Non	
Est-ce que tu aimes les Smarties?	Oui	Non	
Quelle récompense aimes-tu le mieux?	Raisins Secs	Smarties	Les deux
	Aucun		

Note: *If child states that they do not like one stimulus (e.g., raisins or smarties), ask them if they like another (e.g., small stickers or large stickers), and then repeat instructions with liked stimulus and indicate this was done below*

Child did not like: _____

Experimenter asked if child likes: _____

Experimenter repeated instructions using new stimulus (*circle*): YES NO

Child liked new stimulus (*circle*): YES NO

Name of preferred stimulus: _____

Confirm task order

**Always present least-preferred stimulus (e.g., the one they like less) first*

**If they say that they like both, proceed with usual order of raisins first and smarties second*

**If they say they like neither, proceed with usual order of raisins first and smarties second*

Confirm task order by circling the stimulus used first (less preferred) and the stimulus used second (preferred):

First stimulus:	Raisins	Smarties	Small Stickers	Large Stickers
Second stimulus:	Raisins	Smarties	Small Stickers	Large Stickers

➔ **Note:** *For the rest of the protocol, assume that the term "raisins" refers to the less preferred stimulus and "smarties" refers to the preferred stimulus.*

Explications

- Maintenant c'est à ton tour.
- Tu vas jouer à chaque jeu une fois.

- En premier, tu vas jouer au jeu des raisins secs sur le plateau vert pendant 3 minutes [*pointez le plateau vert*].
- Ensuite, tu vas jouer au jeu des *Smarties* sur le plateau bleu pendant 3 minutes [*pointez le plateau bleu*].

Vérification de la mémoire

[*Encerclez la réponse aux questions ci-dessous*]

Question A

Okay, donc à quel jeu vas-tu jouer en premier?	Correct Answer	Incorrect	Don't Know	No
*Si raisins secs/vert → <i>C'est exact, tu auras le plateau vert avec le jeu des raisins secs</i>				
*Si bleu/Smarties → <i>Non, tu auras le plateau vert avec le jeu des raisins secs</i>				
*Si je ne sais pas → <i>Tu auras le plateau vert avec le jeu des raisins secs</i>				
* Si l'enfant donne une mauvaise réponse, répétez la question de vérification de la mémoire				
Okay, donc à quel jeu vas-tu jouer en premier?	Correct Answer	Incorrect	Don't Know	No
*Si l'enfant donne encore la mauvaise réponse, corrigez l'enfant et continuez				

Question B

Okay, donc à quel jeu vas-tu jouer après ça?	Correct Answer	Incorrect	Don't Know	No
*Si Smarties/bleu → <i>C'est exact, après le jeu des raisins secs, tu auras le plateau bleu avec le jeu des Smarties</i>				
*Si vert/raisins secs → <i>Non, après le jeu des raisins secs, tu auras le plateau bleu avec le jeu des Smarties</i>				
*Si je ne sais pas → <i>Après le jeu des raisins secs, tu auras le plateau bleu avec le jeu des Smarties</i>				
* Si l'enfant donne une mauvaise réponse, répétez la question de vérification de la mémoire				
Okay, donc à quel jeu vas-tu jouer après ça?	Correct Answer	Incorrect	Don't Know	No
*Si l'enfant donne encore la mauvaise réponse, corrigez l'enfant et continuez				

Question C

Donc, comment obtiens tu un raisin sec dans ce jeux?	Correct Answer	Incorrect	Don't Know	No
*Si la réponse est correct (ex. mettre un jeton dans la boîte verte) → <i>C'est exact, tu mets un jeton dans la boîte verte pour avoir un raisin sec</i>				
*Si la réponse est incorrect → <i>Non, tu mets un jeton dans la boîte verte pour avoir un raisin.</i>				
*Si autre réponse → <i>Tu mets un jeton dans la boîte verte pour avoir un raisin sec</i>				
*Si la réponse est incorrect, répétez la question de vérification de la mémoire				

Donc, comment obtiens tu un raisin sec dans ce jeux?	Correct	Incorrect	Don't Know
	No Answer		
* Si l'enfant donne encore la mauvaise réponse, corrigez l'enfant et continuez			

Question D

Donc, comment obtiens tu un <i>Smartie</i> dans ce jeux?	Correct	Incorrect	Don't Know
	No Answer		
*Si la réponse est correct (ex. mettre un jeton dans la boîte bleu) → C'est exact, tu mets un jeton dans la boîte bleu pour avoir un <i>Smartie</i> .			
*Si la réponse est incorrect → Non, tu mets un jeton dans la boîte bleu pour avoir un <i>Smartie</i> .			
*Si autre réponse → Tu mets un jeton dans la boîte bleu pour avoir un <i>Smartie</i> .			
*Si la réponse est incorrect, répétez la question de vérification de la mémoire			
Donc, comment obtiens tu un <i>Smartie</i> dans ce jeux?	Correct	Incorrect	Don't Know
	No Answer		
* Si l'enfant donne encore la mauvaise réponse, corrigez l'enfant et continuez			

Instructions

- Maintenant c'est à ton tour de jouer aux deux jeux.
- Je te donne cinq jetons à utiliser : un, deux, trois, quatre, cinq. [*Placez les jetons sur la table en les comptants à voix haute*]
- Ce sont tous les jetons que tu as pour les deux jeux.

Base de référence (baseline condition):

- Maintenant, c'est à ton tour de jouer aux deux jeux
- Mais souviens toi, un jeton te donne une friandise et une fois que tu as mis le jeton dans la boîte, tu ne peux pas le sortir.

Message-guide (prompt condition):

- Maintenant, c'est à ton tour de jouer aux deux jeux
- Mais souviens toi, un jeton te donne une friandise et une fois que tu as mis le jeton dans la boîte, tu ne peux pas le sortir.
- Si tu veux, tu peux utiliser tous tes jetons dans le jeu des raisins secs, ou tu peux garder des jetons pour le jeu des *Smarties*.

Commencez le jeu des raisins secs

- Donc maintenant c'est le temps du jeu des raisins secs.
- Je vais ranger le jeu des *Smarties* [*Placez le plateau bleu avec les *Smarties* hors de vue*].
- Mon chronomètre est réglé et il sonnera dans 3 minutes. C'est le temps que tu auras pour jouer au jeu des raisins secs.
- Je vais m'asseoir là-bas et je ferai du travail pendant que tu joues à ce jeu.
- Commençons maintenant [*assoyez-vous en orientant votre dos à l'enfant et faites semblant de travailler*].

Verbalisation de stratégie d'épargne avant la tâche des raisins secs

L'enfant a-t-il verbalisé une stratégie d'épargne?	Oui	Non
--	-----	-----

Combien
Décrivez toutes stratégies d'épargne

[Utilisez le tableau pour noter vos observations]

Observations pour le jeu des raisins secs

Temps	# de jetons utilisés	Tentatives de récupération des jetons	Verbalise une stratégie d'épargne	Tente de manger la récompense sans utiliser de jetons	Autres observations verbales ou comportementales (enfant ou experimentateur)
0:00-0:30					
0:30-1:00					
1:00-1:30					
1:30-2:00					
2:00-2:30					
2:30-3:00					

- # total de jetons utilisés pendant le jeu des raisins secs: _____

Vérification de la mémoire

[Encerclez la réponse aux questions ci-dessous]

Okay, nous avons terminé ce jeu, te souviens-tu à quel jeu tu vas jouer maintenant?	Raisins secs	Smarties
*Si Smarties/bleut → C'est exact, c'est maintenant le temps du plateau bleu avec le jeu des Smarties		
*Si raisins secs/vert → Non, c'est maintenant le temps du plateau bleu avec le jeu des Smarties		
*Si je ne sais pas → C'est maintenant le temps du plateau bleu avec le jeu des Smarties		
* Si l'enfant donne une mauvaise réponse, répétez la question de vérification de la mémoire		
Okay, te souviens-tu ce que je vais apporter dans la pièce maintenant?	Raisins secs	Smarties
*Si l'enfant donne encore la mauvaise réponse, corrigez l'enfant et continuez		

Je vais ranger le jeu des raisins secs. [Ranger le plateau vert hors de vue]

Si l'enfant a des jetons :

Je vais sortir le jeu des smarties. [Sortir the plateau bleu avec les smarties et le mettre sur la table]

Mon chronomètre est réglé et il sonnera dans 3 minutes. C'est le temps que tu auras pour jouer au jeu des Smarties. Je vais faire un peu de travail là-bas pendant que tu joues à ce jeu.

Commençons maintenant.

[Utilisez le tableau pour noter vos observations et arrêtez le jeu lorsque l'enfant a utilisé tous ces jetons]

Si l'enfant n'a pas de jetons :

Oh, regarde, tu n'as pas de jetons pour le jeu des *Smarties* en ce moment, alors je veux te poser deux questions.

Verbalisation de stratégie d'épargne avant la tâche des smarties

L'enfant a-t-il verbalisé une stratégie d'épargne ?	Oui	Non
Combien		
Décrivez toutes stratégies d'épargne		

Observations pour le jeu des Smarties

Temps	# de jetons utilisés	Tentatives de récupération des jetons	Verbalise une stratégie d'épargne	Tente de manger la récompense sans utiliser de jetons	Autres observations verbales ou comportementales
0:00-0:30					
0:30-1:00					
1:00-1:30					
1:30-2:00					
2:00-2:30					
2:30-3:00					

- # total de jetons utilisés pendant le jeu des Smarties: _____
-

Verbalisation de stratégie d'épargne après la tâche 2

L'enfant a-t-il verbalisé une stratégie d'épargne?	Oui	Non
Combien		

Appendix E

OSF Preregistration

Preregistration Template from AsPredicted.org

Milyavskaya, M., Atance, C., Kamawar, D., Dueck, K., & Aubin, E. (2019, January 1). Token Savings Study: Self-Continuity Across Time in Preschoolers. Retrieved from osf.io/by7kt

Have any data been collected for this study already?

No, no data have been collected for this study yet

What's the main question being asked or hypothesis being tested in this study?

This study uses a new "saving" task to test the hypothesis that children who are "prompted" to save (i.e., by being given an explicit statement about the possibility of saving) will save more (in this case, tokens to "buy" a preferred treat) than children who are not prompted (and, thus, for whom the possibility of saving is not explicitly mentioned)

Describe the key dependent variable(s) specifying how they will be measured.

The dependent variables both are in relation to children's saving behavior. More specifically, we score their saving of token for their preferred treat in two ways: i) Decision to save -- Did the child save any tokens for the smarties game? (Yes/No) ii) Amount saved -- How many tokens did the child save for the smarties game? (range of 0-5) We are interested both indicators of the ability to save because it is not clear what the 'ideal' number of tokens to save is, but it does seem clear that saving at least one token is adaptive. Thus, we will consider children's saving behaviour both in terms of whether they were able to save at all (i) and in terms of how many tokens they saved (ii).

How many and which conditions will participants be assigned to?

Participants will be assigned to one of two conditions: i) the prompt condition - In this condition, children will receive a verbal prompt to save tokens for their preferred treat. Specifically, before beginning the trials, they will hear: "If you want to, you can use all of your tokens in the raisins game, or you can save some tokens for the smarties game" ii) baseline condition - In this condition children do not receive any kind of prompt to encourage them to think about saving before beginning the trials. The full protocol of both conditions is available on OSF.

Specify exactly which analyses you will conduct to examine the main question/hypothesis.

Our primary analysis will be an independent-samples t-test to determine whether children in the "prompt" condition save more tokens than children in the "baseline" condition. We will also classify children as "savers" (saved at least one token) or "non-savers" (saved no tokens) and test our above hypothesis by running a Pearson's chi-square test.

Any secondary analyses?

A secondary question of interest is whether there are any effects of the child's age and the interaction between age and condition on saving behaviour (the two DVs as outlined above). To test this, will run regression analyses using age (in months), condition, and their interaction to predict children's saving. Additional exploratory analyses will examine the relation between demographics and parent-reported data on child savings. We will use demographic data to explore whether characteristics, such as ethnicity, number of languages used in the home, household income, and level of parental education predict children's saving; finally, all parents will complete a questionnaire that asks them to rate their child's saving, attentional focusing, and

inhibitory control and so we will also use regression analyses to determine whether these factors predict children's saving.

How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

We ran a power analysis based on earlier, related findings which demonstrated a large effect size ($\eta^2 = 0.119$; Atance, Metcalf & Thiessen, 2017). For a two-tailed test with an effect size of $d = .735$, with 80% power, we will need at least 62 participants in total (31 per condition). We will continue to collect data until we have reached this sample size, or until the end of April (the end of our academic term), whichever is later. Thus, our minimum sample size will be $n = 62$.

Anything else you would like to pre-register? (e.g., data exclusions, variables collected for exploratory purposes, unusual analyses planned?)

We will check that our random assignment was successful by comparing the conditions on age, parental SES, and parental education. If the conditions do not match on one of the variables, that variable will be controlled for in the analyses. We will also check whether the child understood the task by looking at their answers on the comprehension question and at the experimenters' notes (e.g., if the child put in tokens but did not take treats). Those who did not understand the task will be excluded.