Preschoolers' Saving Performance: The Role of Budgeting and Psychological Distance

by

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Abstract

The current study explored how creating a budget for oneself versus another might improve preschoolers' saving performance. Children were given tokens to purchase later available more-preferred prizes instead of spending them on immediately available less-preferred prizes. N=75 three- to five-year-olds were randomly assigned to one of three conditions: Baseline, Budgeting-Self, or Budgeting-Other. Children completed a general planning task, a Theory of Mind Scale, and a general language ability measure. Children saved significantly more tokens in the Budgeting-Other condition compared to Baseline, $p = .001$. More children were Savers (saved at least one token) in the budgeting conditions compared to Baseline, $p = .001$; however, the proportion of savers did not differ between the budgeting conditions. Children who were Planners (budgeted at least one token) were more likely to be Savers, $p = .009$. The other cognitive measures were not significant predictors of saving.

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Humans spend a substantial amount of time anticipating, contemplating, planning and saving for the future. Our future thinking is directed towards ordinary tasks such as planning a meal or packing for a trip, but also toward important life choices that will have a lasting impact on our success and well-being, such as saving for retirement, deciding on a career path, or getting married. Although thinking about the future is an essential part of human cognition, traditionally, more attention has been devoted to the study of memory than to the study of future thinking (Atance, 2015). However, researchers have begun to focus on the capacity to mentally project oneself forward in time to anticipate and plan for future events, states and needs; this has been named *mental time travel* (Suddendorf & Corballis, 2007). Additionally, research in the past decade has found that the ability to reflect on the future, and one's future self, emerges early in development and undergoes striking changes during the preschool years (Atance, 2015). By 3 years of age, children have the ability to use language to denote the future and are able to describe future events (Atance & O'Neill, 2005). Children between 3 and 5 years of age become increasingly accurate in their prediction of future events (e.g., Busby & Suddendorf, 2005; Quon & Atance, 2010). Moreover, they are able to make decisions in the present that will allow them to solve a problem or prevent a mishap in the future (e.g., Suddendorf, Nielson & von Ghlen, 2011). Their general planning skills also dramatically improve and they perform better at tasks requiring them to select appropriate items to fulfil future needs for both hypothetical and real-life scenarios (e.g., Atance & Meltzoff, 2005; Russell, Alexis & Clayton, 2005).

Many aspects of young children's daily lives depend on the capacity to think about the future. For example, a child might plan what they will bring to a future event, complete a chore to receive a reward in the future, or save a limited resource for future enjoyment. These future-

oriented behaviours are worth investigating as they mark the transition from children simply reacting to events as they occur, to actively adjusting their behaviour in anticipation of future events. Furthermore, the emergence of future-oriented thinking plays an important role in children's cognitive development.

Some aspects of future oriented behaviour, such as the capacity to delay gratification, have been widely examined. Delay of gratification, described as "future-oriented self-control" (Mischel, Shoda & Rodriguez, 1989) has been researched extensively in young children. In the classic delay of gratification paradigm (e.g., Mischel et al., 1989), children are presented with a choice between a highly desirable reward (e.g., 10 mini marshmallows) and a less desirable one (e.g., 2 mini marshmallows). The children can either have the less desirable reward immediately or wait (5-15 min) for the larger reward. The goal of the paradigm is to explore whether children have the ability to postpone immediate gratification to attain a delayed more valuable reward. Although there are individual differences, the ability to delay gratification has been shown to increase with age and is correlated to many positive life outcomes such as better social and cognitive functioning and a healthier lifestyle (e.g., Mischel, 2014).

Other future-oriented abilities, such as saving, are relatively understudied in young children. Saving reflects the act of setting aside a limited resource for future consumption (Canova, Manganelli-Rattazzi & Webley, 2005). Although self-control and saving are similar, they are considered distinct concepts (Metcalf & Atance, 2011). Saving requires one to do without the immediate reward in order to achieve a later one, whether it be more desirable or not (e.g., saving money to pay off one's rent, rather than spending it on a fancy watch). In contrast, when delaying gratification, one does not have to forgo the immediate reward completely but instead must wait to receive a more desirable reward. For example, in the delay of gratification

task mentioned above, children can either have a small reward right away or wait and have that smaller reward, along with more of that reward, later (Mischel, Shoda & Rodriguez, 1989). Thus, they are not missing out on the immediate option, but rather are waiting for a more desirable version of it (Kamawar, Connolly, Astle-Rahim, Smygwaty & Vendetti, 2018; Metcalf & Atance, 2011). Given this important difference, investigating the emergence of saving behaviour during the preschool period, in itself, is informative (Metcalf & Atance, 2011). The goal of the current research is to further investigate young children's emerging ability to save and examine factors which contribute to it.

The preschool years are marked by a gradual transition from reflexive stimulus-control to reflective self-control over behaviour (Zelazo, 2004). This transition is demonstrated by substantial improvements in executive function, which is defined as higher order regulatory processes, including inhibition, planning and working memory (Carlson, 2005). These skills are required for many important mental processes such as planning, focusing attention, remembering instructions and multi-tasking. An executive function skill that is particularly relevant to saving is planning. In the following section, I will describe planning and how it relates to saving.

Planning refers to the ability to problem solve for the future through the use of goal setting and consideration of future needs or desires (Atance & Meltzoff, 2006) and is a skill that emerges during the preschool years, with 5-year-olds outperforming 3-year-olds on planning tasks (Hudson & Fivush, 1991). Components of planning such as goal representation and envisioning of actions necessary to achieve a goal, require thought about the future and emerge around the same time as mental time travel (Atance, 2008). These components of planning are also evident in saving behavior, however, very little is known about the role that planning has in young children's ability to save. Among the many studies examining future oriented thinking

and planning in young children, only a few have examined saving behavior in particular. While these studies have shown that preschoolers do possess some ability to save, little is known about how they are able to create and follow through with a savings plan. Only one study, conducted by Kamawar et al. (2018), has examined how planning contributes to saving behaviour in young children. This study (described in greater detail later) demonstrates that preschoolers can in fact create savings plans (i.e. budgets) and that budgeting is beneficial to their saving behaviour.

The ability to save is also expected to relate to other cognitive capacities such as theory of mind, which is defined as the ability to attribute mental states—beliefs, intents, desires, emotions, knowledge, to oneself and to others (Premack & Woodruff, 1978). Research suggests that adult-like ToM begins to emerge by age 4 (e.g., Flavell, Flavell, Green & Moses, 1990; Gopnik & Slaughter, 1991; Wellman, Cross & Watson, 2001; Wellman & Liu, 2004). The ability to project oneself forward in time to anticipate future needs and desires requires the understanding that one's own mental states can change across time (as per Metcalf & Atance, 2011). Thus, it has been argued that future oriented thinking and aspects of ToM are related (e.g., Atance & Meltzoff, 2005; Suddendorf & Busby, 2003; Suddendorf & Corballis, 1997).

Theory of mind has recently been examined in relation to psychological distance, which is defined as mentally separating oneself from an immediate situation (i.e., self-distancing), allowing for greater reflection and consideration of future goals (Lee & Atance, 2016). Research has shown that young children's future thinking may be improved by introducing psychological distance by having them pretend to be someone else. This effect seems to be beneficial particularly to those children who demonstrate more mature theory of mind skills. I will discuss Theory of Mind and its relation to saving below.

In addition, self-distancing strategies have been shown to improve reasoning and performance on both delay of gratification and executive function tasks. However, to my knowledge there are no studies as of yet, that have specifically investigated the effect of psychological distance on preschoolers' saving behaviour. Furthermore, additional research is necessary to better understand how planning is related to preschoolers' ability to save and the role that planning for another person (psychological distance) may play in the creation and implementation of a savings plan. This is the focus of the current study.

Prior to describing the current study in detail, the literature surrounding the development of saving ability in children, with a brief overview of the relevant adult literature on this topic, will be reviewed. This analysis will highlight the need for future research examining the development of saving during the preschool years. In addition, cognitive factors associated with successful saving will be reviewed. Specifically, planning, and Theory of Mind. Additionally, an overview of the literature examining the effects of psychological distance on future oriented thinking will be presented. Finally, the rationale for the current study, description of its methodology and hypotheses will be outlined.

Saving

As mentioned earlier, saving is defined as the postponement of resources for enjoyment at some point in the future (Atance & Metcalf, 2011). Humans regularly engage in saving behaviors in anticipation of future needs. For example, people must save money for short-term goals, such as buying groceries, paying their rent etc., while they save for long-term goals such as retirement. They must also save time and resources to complete different tasks in their daily lives. Thus, saving is considered a highly adaptive aspect of human's future oriented behavior (Atance & Metcalf, 2011). Saving is also a relevant topic in light of current economic trends,

with saving rates continuing to decline in a number of countries including Canada, Australia, the United Kingdom and Japan (Pasquali & Aridas, 2013, as cited in Atance et al., 2017). These trends suggest that today's children will need to save more in young and middle-adulthood to ensure that they have adequate funds to maintain their lifestyle through retirement. Moreover, it is crucial to prepare children now on how to save for their future. In order to do so, we must examine the development of saving behaviors in young children and continue to discover effective strategies to help improve children's capacity to save. These issues are currently relatively unexplored.

There is limited research examining saving ability among preschoolers as most research surrounding children's saving behaviour has been conducted with children 6 years and older. One of the first studies to investigate saving behavior in young children was conducted by Sonuga-Barke and Webley (1993) with 4-, 6-, 9- and 12-year-olds. The researchers developed a complex "play economy" board game in which children were given tokens that they could either spend throughout the game on less desirable rewards or save to buy a toy from the toyshop at the end of the circuit. Results showed that performance improved between 6- to- 12- years of age and that the older children were more likely to save their tokens compared to the 4-year-olds. It is unclear, however if the 4-year-olds were simply unable to save or if they had difficulty understanding the task (play economy), as tokens are an abstract representation of value that may be difficult for young children to understand. To address this limitation, Metcalf and Atance (2011) created a more age-appropriate experimental paradigm to measure saving in preschool children. This savings paradigm was designed to assess whether young children can save the limited resource itself for future use, and whether they can learn from having experienced what it is like to have failed to save.

The researchers hypothesized that the development of saving behaviours would be related to the child's ability to mentally project themselves into the future and experience events before they occur, known as mental time travel (described above). Instead of using the play economy, in this study, children did not have to save tokens to trade in for a future reward, but instead saved marbles to use to play a marble game. This approach was less abstract and expected to be more likely to be understood by preschoolers.

In this paradigm, children received two trials of a savings task. Children were first shown two rooms: one room contained a small marble game consisting of one simple marble run, while the second room contained a larger, more desirable marble game that consisted of three paths. The children were shown how the two marble runs worked and were told that each marble could only be used once. Children were then given three marbles which could be used only once each and that there were no others available. Next, they were told that they would stay in one room for 3 minutes and then would go to the other room for another 3 minutes. The researchers were interested in the number of marbles that children would save for the second room (Atance & Metcalf, 2011).

Children were divided across two conditions. In the more rewarding-future condition, children visited the room with the small marble game first and the room with the larger marble game second. In the more rewarding-present condition, children visited the room with the larger marble game first and the room with the smaller marble game after. This design was implemented to determine whether children's savings performance was affected by actually saving for their preferred marble game. In trial 2, the experimenter told the children that she had found three additional marbles for them to play with and the procedure from trial 1 was repeated. The goal of this trial was to determine whether the children who had experiencing the

disappointment or boredom of not having any marbles left to play with in trial 1 would go on to save some for the second game, when given another opportunity to play again. More specifically, the researchers were interested in whether the children would reflect on a recent past experience when making present decisions that would impact their future selves (Atance & Metcalf, 2011).

Results showed that children did not save much in trial 1 in either condition (39% of the them saved marbles in the more-rewarding future condition and 29% in the more-rewarding present condition). The majority of children may have been unable to anticipate how they would feel after having spent all their marbles because they had not yet experienced this event. Alternatively, the children may have had trouble inhibiting the urge to use their marbles on the game that was immediately available (Atance, Metcalf & Thiessen, 2017). This would make sense as younger children have less well-developed inhibitory control skills (Sabbagh, Xu, Carlson & Moses, 2006), and may have not been able to stop themselves from spending their marbles in the first room. It is also possible that young children understand the concept of saving but lack the necessary skills to follow through with it (due to deficits in self-control, planning, executive functioning, etc.).

Interestingly, children saved significantly more marbles on the second trial across both conditions. Results showed that 58% of children saved at least one marble in the more-rewarding- future condition and 34% in the more rewarding-present condition. This finding is important as it demonstrates that young children have the ability to learn and adjust their behaviour to benefit their future selves. Evidence showed that even 3-year-olds were able to draw on recent experience to facilitate their future oriented decision making and showed evidence of learning after a single trial (Atance et al., 2017). Furthermore, this study has made it

clear that children as young as 3-to-5-years of age are capable of saving in the appropriate context.

This new age -appropriate savings paradigm is a valuable contribution to this research area as it is less abstract, more straightforward, and easier for young children to understand. In addition, it measures young children's ability to save a consumable resource and demonstrates that they are capable of saving with this paradigm. However, this study did have some limitations. Firstly, the researchers only examined the specific behaviour of saving marbles to measure children's understanding of saving. They did not explore the role of planning and how it may contribute to successful saving. Further, the measures in this study did not make it clear which of the children had made a plan to save, knew how to save or had the intention to save in Trial 1, as it may have only captured the children's ability, or inability, to stop themselves from using all of their marbles on the first marble run. Performance on Trial 2 may be a better indicator of children's understanding of saving and some children may have created a plan to save some marbles after having learned from experience (i.e., being disappointed or bored in the second room). Secondly, children were only given three marbles to use per trial, which may not have given them enough opportunity to determine their preference and how they should use their marbles. Thus, it may have made it difficult to detect a significant variability in saving and age-related differences due to this restriction. Lastly, children had to decide for themselves if they wanted to save their marbles for the future, without any prompt to do so. In most future oriented tasks, children are given several options and their future-oriented behavior is usually generated in response to a question or prompt from the experimenter (as per Atance et al., 2017). Young children may not have spontaneously generated the idea to save, but may be able to do so if the possibility is brought to their attention. Providing them with the option to do so may help young

children to consider their future self and compare both scenarios (e.g., the pleasure of having marbles left to play with the large marble run, or the disappointment of not having marbles left to play with the large marble run). Atance et al. (2017) examined the benefits of making that option clear.

In their follow-up study, Atance et al. (2017) explored whether 3-, 4- and-5-year-olds' saving ability can be facilitated by a verbal prompt that states their two options. More specifically, after receiving their marbles, they heard, "If you want to, you can use all of your marbles in the red (blue) room or you can save some marbles for the blue (red) room" (p. 72). The children were told that they would be staying in the room containing the little marble game for the first 3 minutes and after would stay in the room containing the large marble game for another 3 minutes. The researchers compared children's saving behavior in the prompted condition to the spontaneous condition. The researchers hypothesized that children would perform better in the prompted condition as previous research has shown that verbal prompts instructing children to "stop and think" before acting have promoted prosocial decision making among students from preschool through high school (Hall, Jones & Claxton, 2008).

As hypothesized, children in the prompted condition saved significantly more marbles compared to the children in the spontaneous condition. The authors interpreted this to mean that alerting children of their options (saving or spending) may help to improve saving behavior and encourage more adaptive future-oriented decision making (Atance et al., 2017). Although these findings suggest that young children's saving behavior benefitted from considering their future selves, it is unclear whether they formulated specific plans to save their marbles and whether they actually followed through with those plans (Kamawar et al., 2018). Further, little is known

about how cognitive skills, such as the ability to plan contribute to saving behaviors in young children (Kamawar et al., 2018).

Kamawar et al. (2018) were the first to explore the relation between planning ability and saving ability in young children. They examined how preschoolers' general ability to plan as well as their ability to budget (i.e., create a detailed plan for spending and saving a limited resource) is related to their saving behavior. More specifically, they examined whether having the opportunity to develop and form an explicit plan (i.e., a budget) would improve young children's saving behavior. They argued that since preschoolers engage in saving (Atance et al., 2017; Metcalf & Atance, 2011) and possess the ability to plan ahead (e.g., Atance & Jackson, 2009; Carlson, Moses & Claxton, 2004) that their saving behavior would likely benefit from the opportunity to create a savings plan. They also considered the possibility that preschoolers may be capable of creating a saving plan but struggle to follow through with the implementation of the plan due to limitations in self-control.

In their study, 3-to-5-year-olds completed a series of tasks including a Delay Choice task to measure self-control, a Truck Loading task to measure general planning ability, a savings task, and a receptive vocabulary measure (Peabody Picture Vocabulary Test, 3rd ed. [PPVT-III]) to control for general language ability. These measures were chosen as they have been shown to demonstrate significant improvement in performance between the ages of 3 and 5 (Kamawar et al., 2018). Two marble runs, one big and one small were used during the Saving Paradigm. The paradigm consisted of two conditions: the control condition, which was similar to Metcalf and Atance's (2011) study, and the budgeting condition, which was designed to investigate whether having the opportunity to budget would benefit children's saving behaviour. Each condition consisted of two trials. In both conditions, children were shown two rooms which were

introduced as either "the red room" or "the blue room" and they contained either the large or the small marble run. The order in which the rooms were introduced as well as the colors assigned to the rooms was counterbalanced across participants. The savings task was very similar to the paradigm administered in Metcalf and Atance's (2011) study, with the exception of three changes: first, children were given five marbles rather than three to allow for variability in budgets; second, children were allowed to try each marble run prior to beginning the task so they could understand the difference between them, and see that at the end of the run each marble went into a box and could not be used again; and third, after trying both marble runs, the children were shown a photo of each of them and asked which one they liked best. This allowed the experimenter to make sure the child's preferred marble run would be in the second room prior to the start of the task. Children were told that they would first spend 3 minutes in one of the rooms (the one containing their least preferred marble run), followed by 3 minutes in the other room (the one containing their preferred marble run).

In Trial 1 of the Control condition, children were given a box containing 5 single-use marbles. They brought the box with them to both rooms, regardless if they had marbles left to use after the first room. After trial 1 was complete, the experimenter gave the child 5 more marbles to play again. In trial 2, the child once again spent 3 minutes in the room containing their least preferred run, followed by 3 minutes in the room with the preferred marble run, however, the task was ended once the child used all five marbles, if this occurred before time had elapsed. On each trial, the number of marbles children saved for their preferred marble game was recorded. In addition, children were coded as "Savers" if they saved at least one marble for their preferred game on one trial and "Consistent Savers" if they saved at least one marble on both trials.

In the Budgeting condition, participants were given a small tray containing two bowls each with a photo of one of the marble games propped up behind it. The bowls matched the color of the rooms (red or blue) and were placed in the order of their preference (less preferred first and preferred second). The children were given a box containing five marbles. They were told "You only get five marbles today. You get to decide how many marbles you want to use in each room." (p. 6). Then they were given the two bowls and were told to put the amount of marbles they wanted to use for each marble game in the corresponding bowls. They were asked a memory question about which bowl went with each marble run and were provided with corrective feedback when necessary. The researchers did not use words like "save" or "plan" and they did not provide any feedback on the child's budgeting decisions. After the child had allocated the marbles, the tray containing both bowls was brought to each room. Therefore, the child had access to all the marbles and could follow their savings plan (by using the number of marbles they had allocated for each room) or deviate from it (e.g., if they could not exercise self-control).

The same procedure was repeated in trial 2, once they were given five new marbles and were told to allocate them into the new bowls. For each trial, the number of marbles planned for each marble run was recorded as well as the number of marbles that were actually saved for the preferred run. As in the control condition, children were coded as Savers in a trial if they saved at least one marble for their preferred marble run and were coded as Consistent Savers if they were savers in both trials. In addition, those who planned to save at least one marble for their preferred room for a given trial were coded as "Planners" and those who were planners in both trials were coded as "Consistent Planners".

Results revealed that, similar to Metcalf and Atance (2011), children in the control condition benefitted from experience, as they saved significantly more marbles for their preferred marble game, in trial 2. In trial 1, children in the budgeting condition saved significantly more marbles for their preferred game compared to the control participants. This finding demonstrates that the opportunity to budget improved saving behavior, at least on the first trial. Further, the majority of planners saved at least one marble for their preferred game and those who were consistent planners were more likely to save for their preferred game on both trials. This finding confirms that preschoolers do in fact benefit from creating a budget, when they must save a limited resource for future enjoyment. The general planning measure (Truck Loading Task) was significantly correlated with the number of marbles saved for the preferred game in trial 1 of the budgeting condition only. Therefore, when given the opportunity to budget, children who scored higher on the planning task saved more marbles in the saving task. There was not a significant correlation, however, between the self-control measure (delay choice task) and the number of marbles saved. This result is consistent with the argument that self-control (DoG) and saving are distinct skills (Atance et al., 2017, Lee & Carlson, 2015; Metcalf & Atance, 2011). Thus, there may not be a strong relation between these two abilities (as per Kamawar et al., 2018).

Results from this study are also consistent with Atance et al.'s (2017) finding that encouraging children to engage in *episodic foresight* (the capacity to mentally project oneself into the future to pre-experience events and their personal relevance; Metcalf & Atance, 2011) results in more saving. The children had to consider their future selves when allocating the marbles as they had to think about what would be more enjoyable to them and then plan accordingly. In addition, the children who could see their budget (the marbles divided into the

two bowls) were reminded of their saving plan which may have encouraged them to more carefully consider each decision to spend. These findings could have practical implications for helping preschoolers save for their future selves. For example, parents could provide opportunities for their young children to formulate tangible saving plans, such as separating their candy into two bowls and having the candy from one bowl that week, while saving the other for the following week.

There are some possible limitations to this study. Kamawar et al. (2018) raised the question of whether it is ideal to save all of the marbles in the first room and only spend them in the second room. They argue that perhaps it is in the child's best interest to have slightly fewer marbles in the future to avoid being bored in the present. In other words, children may want to spend a few of their marbles on the first game and save the rest for the second game. Thus, given this paradigm, it may not be the total number of marbles saved for their more-preferred run, but rather the strategy behind their saving behavior (i.e., how they chose to allocate the marbles for each marble run) that is indicative of successful saving. This relates to Lee and Carlson's (2015) study which investigated children's ability to adapt their delay and saving behaviour when their preference (to delay or not) became nonadoptive (e.g., when there was a risk of losing rewards). In other words, saving *all* their resources may not always be the best option; it could lead to boredom or disappointment because in the end, they only play one of the two games instead of being able to play both, and they must wait (the entire amount of time) to play the second game. Furthermore, the number of marbles saved that constitutes a 'mature' budget is unknown. It makes sense that they should save more marbles for their more- preferred run, but it is unclear how many more. This is why, Kamawar et al. (2018) created the term 'Planners' and 'Savers' which meant that the child planned and or saved at least one marble for

their more-preferred game. That way, they would be able to play their preferred game at least once.

In addition, the second marble run may not be exciting enough for the older children. Therefore, they may have less incentive to save up their marbles for the second room. Increasing the degree of difference in desirability between the two rooms may encourage the older children to save more for the more desirable run, which in turn may result in an age-related change in this task (Kamawar et al., 2018). The current study will provide children the opportunity to create a budget for themselves, but will also explore a new strategy to potentially improve saving behaviour, by asking them to create a budget for another person (psychological distance).

In summary, Kamawar et al.'s (2018) study has highlighted two import ways to help young children improve their saving behavior. First, by giving them the opportunity to formulate a budget prior to consuming a limited resource and secondly, by replicating previous findings that allowing them to experience a situation in which failing to save a limited resource led to an increase in saving behavior in the future. However, this research is limited to the saving the resource itself (i.e., saving marbles). Thus, they address only one aspect of saving that children will have to engage in as they get older (saving the consumable resource itself) and not other, important aspects, such as saving a representation or symbol (i.e., saving money).

As previously mentioned, previous savings studies have used tokens by creating a "play economy" board game in which children could either spend their tokens throughout the game on less desirable rewards or save them to buy a more desirable toy at the end of the circuit (e.g., Sonuga-Barke and Webley,1993). Tokens are a more abstract representation of value, similar to money, which resembles saving in a real-life context. However, this task was much too complex for 4-year-olds. What is needed, then, is a task in which children are required to save a symbol (a

token) that can be exchanged for the desirable items, without all of the complexity seen in earlier work.

To address these limitations, Dueck et al. (2019) developed a simplified, and age-appropriate, *Token savings paradigm* to measure saving behaviour in preschoolers. This new paradigm does not consist of an elaborate board game, but rather a shorter, less complicated task, with a small number of tokens. In this task, which is modeled largely on the marble run task described earlier, 3-to-7-year-olds are given the opportunity to save tokens, which could be exchanged, one-for-one, for treats (raisins and smarties). In this task, participants are first introduced to two 'games', one on a green tray, containing a small bowl of raisins, and one on a blue tray, containing a small bowl of Smarties. Each tray also contains a small colour-matched box for the children to deposit their tokens. First, the children complete a preference check to see which of the two treats they prefer more (to determine the order in which they would play the games). Children play the game containing their least preferred treat first, followed by the game containing their more preferred treat. The experimenter explains to the children that one token "buys" them one treat and that once they put a token in the box, they cannot take it out because 'it is all used up'. They are also told that they will receive 5 tokens in total.

The researcher demonstrates how to play both games by placing a token in each box and taking one treat each time (one raisin and one Smartie). The children practice putting a token in the box and taking one treat from each tray, before starting the first game. Next, the children are told that they will spend 3 minutes playing one game (their least preferred game), followed by 3 minutes playing the other game (their preferred game).

Children are randomly assigned to one of two conditions: baseline or prompt. The purpose of the prompt condition is to examine whether giving the children a verbal prompt to

save would benefit saving behavior, as compared to the baseline condition, as it had in previous saving tasks (e.g., Atance et al., 2017). In the prompt condition, children are told: "If you want to, you can use all of your tokens in the (less preferred game), or you can save some tokens for the (preferred game)". In contrast, in the baseline condition, there is no mention of saving. In both conditions, the experimenter documents how many tokens the children saved for their preferred game and any saving strategies they engaged in during the task. Children only complete one trial of this task.

Preliminary results indicated a significant effect of condition on saving (data collection is on-going), with children in the prompt condition saving significantly more tokens for their preferred game (Dueck et al., 2019). Moreover, there was a higher percentage of Savers (participants who saved at least one token for their preferred game) in the prompt condition compared to the baseline condition. This result is noteworthy as it is consistent with previous findings, suggesting that providing children verbal prompts to save, leads to an increase in saving (e.g., Atance et al., 2017; Kamawar et al., 2018). In addition, this new task is similar to real-life by addressing other types of saving experiences that the child will be exposed to as they get older (i.e., it resembles the act of saving money to buy a desired item in the future).

I employed this Token Savings task in my current thesis, examining the effect of budgeting for self and other (psychological distance). Further, I investigated the role played by two cognitive factors that demonstrate development during the preschool years: Planning and Theory of Mind, and will discuss their relevance to saving behavior.

Planning

Planning is defined as the representation and preparation for a future goal (Atance & Jackson, 2009). Because components of planning, including goal representation and envisioning

of actions necessary to achieve a goal, require thought about the future, planning capacity begins to shift been 4-and-5-years of age, when children become better able to think about their future self (Atance, 2008). The general cognitive skill of planning is often examined within the broader context of Executive Function (EF) skills.

Executive function refers to a set of cognitive skills required to accomplish goal-directed behaviour (e.g., Gioa, Isquith & Guy, 2001). The main factors of EF assessed in young children, 3-to-5 years of age, include planning, delay of gratification (DoG), inhibitory control (IC) and working memory (WM). While planning is the EF skill of interest for the current thesis, it is worth considering the other EF skills briefly.

Inhibitory control is defined as the cognitive process used to prevent the execution of behavior that is incompatible with the demands of a particular task (Chevalier et al., 2012). One's typical course of action, known as the *prepotent response*, can conflict with task goals, therefore, one must learn to withhold this impulsive response in order to select a more appropriate behavior that is consistent with achieving their goals (e.g., Isoda & Hikosaka, 2011). Further, Inhibitory control is divided into two main categories: conflict inhibition (suppressing a desired response and replacing it with a conflicting response) and delay inhibition (delaying a desired response).

Delay of Gratification (DoG), which involves the postponement of immediate gratification to attain a delayed more valuable reward (Mischel 1989), falls under the category of delay inhibition. DoG tasks are typically classified as either waiting paradigms or choice paradigms. Waiting paradigms require the participant to wait a specific amount of time in order to receive a reward. For example, the Gift Delay task (Kochanska, Murray, Jaques, Koenig & Vandegeest, 1996) in which the child, sitting facing away from a gift that is being wrapped, must

wait and resist the temptation of peeking at the gift until they are allowed to open it. The number of times a child takes a peek has been shown to decrease with age (Kochanska et al., 1996). Choice Delay paradigms allow children to choose between having a smaller immediate reward or waiting a certain amount of time to receive a greater more valuable reward. An example of this is the aforementioned Marshmallow task in which children are told that they can either have one marshmallow right away or wait until the experimenter returns, at which time they will receive two. Results from these studies have indicated that children younger than 4 years of age typically choose the smaller reward, while children's ability to delay receipt of the larger reward increases with age (Mischel, 1974).

Finally, working memory refers to one's ability to hold, and manipulate, information in mind (Engle, 2002). Working memory is divided into three subsystems: the phonological loop (referring to verbal storage), the visual-spatial sketchpad (referring to storage and manipulation of visual information), and central executive (referring to the attentional control involved in WM; Baddeley, 2003). One common measure of verbal WM in young children is the Counting and Labeling task (Gordon & Olson, 1998) in which children must name three objects, count them, and finally count and label them simultaneously (the latter skill is the ability of interest). Typically, by 5 years of age, children are able to count and label items successfully (Gordon & Olson, 1998). A common measure of spatial WM in preschoolers, is the Corsi Span (Ramuseen & Bisanz, 2005), where children are instructed to watch the order in which the experimenter's frog jumps on the lily pads, and copy that order with their own frog. Research has shown that 5-year-olds are typically able to copy up to four movements successfully, during this task (Rasmussen & Bisanz, 2005).

These EF skills undergo substantial improvement during the preschool years and are

associated with several major aspects of development, including theory of mind (Hughes & Ensor, 2007), and general academic achievement (Willoughby, Blair, Wirth & Greenberg, 2011).

The EF skill that is being examined, in this thesis, in relation to saving ability is planning. Recall that planning refers to the ability to accomplish a desired goal by determining the steps necessary to reach that goal and then following those required steps (Anderson, 2008). This EF skill has been selected because research has demonstrated that planning ability is predictive of some aspects of young children's future-oriented thinking (Mahy, Moses & Kliegel, 2014).

The emergence of planning ability is regarded as an important developmental achievement as it is a key way in which one can adapt not just to the current state of the world but to anticipated states of the world in the immediate or distant future (McCormack & Atance, 2011). This skill undergoes significant development during the preschool years. For example, Hudson and Fivush (1991) found that 3-year-olds had difficulty in the creation and execution of plans, while 4-and 5-year-olds could construct plans but 5-year-olds were better at plan execution. In addition, 5-year-olds could complete a multiple goal plan whereas 4-year-olds could only complete a single goal plan. This research is important as it provides evidence that young children are capable of constructing single goal plans but have difficulty implementing plans that include multiple goals.

Planning is often measured through the administration of tasks that involve many steps to achieve a particular goal. The two most widely-employed types of early childhood planning tasks are tower based and route planning tasks. Although each task may measure different aspects of children's planning, they have all been used to assess general planning ability in preschoolers. The tower based tasks largely consisting of the Tower of London (ToL) and Tower of Hanoi (ToH) tasks have been the most widely employed tasks to study planning in children

(Atance, 2011). The ToL task, developed by Shallice in 1982, involves a set of 3 or 5 colored discs or balls that are placed on three pegs of differing heights. The participants must manipulate an initial state of the balls to match a goal state shown in a picture. The pegs differ in the amount of balls they can hold at one time and the participants can only move one ball at a time. The ToH is similar, however instead of balls, discs are used. The discs are different sizes and the participants cannot place a larger disc on top of a smaller one. In both tasks, the participants must try to reach the goal state with a minimal number of moves and without breaking any of the rules. Although tower tasks have been used to measure children's planning for decades, only recent studies have used these tasks with 3 and 4 year olds (e.g., Carlson et al., 2004) and there has been some concern as to whether these tasks are suitable for children this young.

Route Planning Tasks have been commonly used to study planning behavior in both preschoolers and older children (Atance, 2011). In these tasks, children are asked to plan the most efficient path to obtain a certain number of specified objects or to complete a maze (Gauvin & Rogoff, 1989; Wellman, Fabricus & Sophian, 1985). Performance on these tasks is taken as an indication of one's ability to reason in advance about which actions are necessary to occupy certain locations in the representation of a sequence. In Gauvain and Rogoff's (1989) route planning task, children are given a small figurine that represents a person shopping. They must move them through the grocery store to gather a list of items and are asked to retrieve them in the shortest route possible. Similarly, The Kitten Delivery Task, a simplified version of the route planning task, was developed specifically for preschoolers and requires them to plan an efficient route to deliver toy kittens to their mother (Carlson et al., 2004). In these type of tasks, participants are only able to plan the shortest route if they consider the before-and-after relation

among the collection of items, and then mentally arrange the order in which the collection should be made (Atance, 2015).

The Truck Loading task is a simpler planning task used to assess general planning ability in young children, 3-to-5 years of age (Carlson et al., 2004; Fagot & Gauvain, 1997). In this task, children take on the role of a mail carrier and are asked to plan their route in advance so that they load up a delivery truck in the most efficient manner. Children use a toy mail truck to deliver different colored party invitations to the corresponding colored houses along a one-way street on which they cannot backtrack. During this task, children take on the role of a mail carrier that delivers color coded party invitations to five colorful houses on one side of a one-way street. The children are asked to plan their route in advance. The delivery task requires that the colour of the invitation and the house match and the invitations must only be taken from the top of the pile. Moreover, children must engage in planning and in order to succeed on the task they must load the invitations in the correct order. In other words, they should start by loading the invitation that will be delivered last. The task consists of four levels of difficulty beginning with two houses and ending with five houses. Children's performance on this task develops during their preschool years, with less than 40% of 4-year-olds reaching the final level of 5 houses compared to 80% of 5-year-olds (Atance & Jackson, 2009; Carlson et al., 2004).

To summarize, a variety of tasks have been developed to assess preschoolers planning ability. These planning tasks all share a basic requirement that children be able to think about or represent points/steps in a sequence, in both an independent and flexible manner. Research has demonstrated significant development in planning ability across the preschool years.

Planning can be seen as playing an important role in saving behavior as the ability to create and follow through with a plan is essential to successful saving. One must plan how they

will manage their current spending while maintaining their future saving goals. As previously mentioned, Kamawar et al.'s (2018) study suggests that 3-to-5 year olds can demonstrate the ability to create a savings plan (i.e., a budget) and that doing so benefits their saving performance. In addition, they found that when given the opportunity to make a budget, children who have better general planning skills (as measured by the Truck Loading task), are also better at saving. In the current study, the Truck Loading task will be used to measure general planning ability and assess its role in saving behavior using the Token Savings Task.

In addition to EF, another relevant cognitive factor to consider is Theory of Mind. It is to be expected that Theory of Mind is related to saving because saving is a future oriented behaviour in which one must anticipate a future need or desire. Thus, it requires thought about one's future self, one's future mental states, and an understanding that mental states can change over time. For example, to be successful in the savings tasks described above, children must consider how their future self will feel if they decide to spend all their marbles or tokens on the immediately available game. In other words, they must be able to think ahead and realize that their actions and decisions in the present will have an impact on themselves in the future. Further, if they do not save any marbles or tokens for their preferred reward, their future self will likely be disappointed and or bored during the second game. Therefore, it is beneficial to their future self to engage in saving behavior, in the present moment. I will now discuss Theory of Mind and how it is expected to be related to saving performance on my proposed study.

Theory of Mind

Theory of Mind (ToM), the ability to understand both the self and other's mental states (e.g., intentions, desires, beliefs), has been studied extensively in young children (for a meta-analysis, see Wellman, Cross & Watson, 2001). ToM includes a number of cognitive skills

which develop starting in infancy. In preschool, ToM development is marked by a change in belief understanding as children realize that beliefs are mental constructions that may or may not accurately represent reality, a skill that has been shown to be achieved around 4 –to- 5- years of age (e.g., Wellman, 1991; Wellman, Cross, & Watson, 2001; Wimmer & Perner, 1983). Moreover, false belief understanding plays a crucial role in children's social and cognitive capacities, such as their ability to understand knowledge and knowledge change, language acquisition, and achievements in literacy and mathematics (Cavdel & Frye, 2017).

Given that there are a number of aspects of ToM, Wellman and Liu (2004) developed a ToM scale to provide an indication of ToM sophistication across the preschool years. This scale, based on their analysis, includes six tasks which assess increasingly complex aspects of Theory of Mind. More specifically, it measures children's understanding of desires, beliefs, knowledge and emotions. Across several studies that have used this scale, there is a similar developmental pattern among preschoolers, progressing from basic desire and belief understanding to an understanding of informational access and false belief, and finally, to an understanding of social display rules (e.g., Peterson, Wellman, & Liu, 2005; Wellman & Liu, 2004; as cited in Cavdel & Frye, 2017). This scale will be used in the current study to measure Theory of Mind skills.

As previously mentioned, the ability to anticipate future desires and needs requires an understanding that one's own mental states can change across time (Metcalf and Atance, 2011). Moreover, it has been argued that future oriented thinking (mental time travel) and ToM are related (e.g., Atance & Meltzoff, 2005; Suddendorf & Busby, 2003). Metcalf and Atance's (2011) study (described above) investigated whether children would reflect on a recent past experience when making present decisions that would impact their future selves. They administered two ToM tasks ("unexpected contents" and "change-in-location") to all children to

determine whether their performance on these tasks was related to their performance on the marble-run saving paradigm. In the *Unexpected contents task* (Perner, Leekman & Wimmmer, 1987) children were asked to reflect on their own false belief (what they thought was in a box before they opened it), whereas in the *Change-in-location task* (Wimmer & Perner, 1983), the children were asked to reflect on a story character's false belief (where the character believes the object is after it was moved without them knowing, and where it actually is).

Results indicated that performance on the Change-in location task was not significantly related to the number of marbles saved on either trial. Performance on the Unexpected contents task was marginally related to the number of marbles saved in trial 2. The researchers' interpretation of these results was that specific forms of false-belief reasoning may differ depending on how they relate to Episodic foresight. Further, they argue that success on the unexpected contents tasks requires children to reason about a belief that occurred at a different time and that the temporal dimension may be what overlapped with children's ability to learn from the past (i.e., from being disappointed or bored), in a way that benefitted their future selves. Moreover, children's future oriented behavior may be influenced by their ability to adopt a different perspective.

Theory of mind has recently been examined in relation to *psychological distance*, which is defined as mentally separating oneself from an immediate situation (i.e., self-distancing), allowing for greater reflection and consideration of future goals (Lee & Atance, 2016). Throughout the preschool years, children improve significantly on ToM tasks requiring mental distance from their own thoughts and emotions, allowing them to adopt a distanced perspective on their own behavior (e.g., Wellman, ross & Watson, 2001). Moreover, self-distancing strategies have shown to be more efficacious for children who demonstrate more mature theory

of mind skills. This concept will be described in more depth in the following sections.

Psychological Distance

As previously mentioned, psychological distance involves mentally separating oneself and taking a step back from the immediate situation, allowing greater flexibility and control over one's thinking and behavior (Lee & Atance, 2016). According to Liberman, Trope and Stephan's (2007) Construal theory, psychological distance is composed of several domains: temporal (present vs. past/future), social (self vs. other), spatial (close vs. far) and hypothetical (certain vs. probable) distance. Further, people close to us whom we know well are construed at a relatively low level, whereas people far from us with whom we are less familiar are construed at a relatively high level (Liberman et al., 2007). In decision making, high-level construals lead people to make more self-controlled decisions compared to low-level construals (Malkoc et al., 2010; Rogers & Bazerman, 2008). Thus, taking the perspective of another person often leads to more adaptive reasoning. Research with adults has shown that they also reason more wisely when solving problems for other people compared to themselves (e.g., Grossman & Kross, 2014; Polman & Emich, 2011). This is likely to occur because they are distancing themselves from the situation and are less emotionally invested. Adults also make wiser decisions when they are asked to think of themselves in third person (White et al., 2015).

Similarly, research suggests that young children, who typically have trouble anticipating future states that conflict with current ones, are better able to reason about another person's future than their own (Lee & Atance, 2016). This may be the effect of psychological distance (i.e., taking the perspective of another person and distancing oneself from their own current states and emotions).

A study conducted by Bélanger, Atance, Varghese, Nguyen, and Vendetti (2014)

investigated 3-,4-and-5-year-olds' ability to understand that their future preferences, as a "grown-up" may be different from their current ones, as a young child. Participants were presented with paired child and adult items (e.g., Kool-Aid and coffee), and were asked what they will like when they are "all grown up". In one of the conditions, children were asked to reason about the preferences of the grown-up self of a same-aged peer. Results showed that 3-year-olds more often chose the child items than the grown-up items in both conditions, while 5-year-olds performed well overall (i.e., they correctly chose the adult items in both conditions). Interestingly, 4-year-olds correctly chose the adult items for a same-aged peer in the future more often than they did for themselves in the future. In summary, this study demonstrated that 3-year-olds have difficulty reasoning about both their own future and the future of another child. However, 4-year-olds are able to appreciate that another child's grown-up preferences may differ from that child's current ones, but they have difficulty applying that same understanding when reasoning about the self. Moreover, it appears that self-distancing themselves from the situation improved their future thinking and allowed them to reason more rationally.

Russell et al. (2010) also found similar results when assessing children's episodic cognition and functional reasoning about the future. In one of their experiments they examined children's perspective taking abilities while they played a "blow football" game that required the experimenter and the child to stand on opposite ends of the table. To play the game from the experimenter's side, the children needed a box to stand on and a straw to blow the ball. At the end of the game, the children were told that another child would be playing the game "tomorrow" from the experimenter's side and asked which items needed to be on that side for that child. Results showed that only 4- and-5-year-olds selected the two correct items that the other child would need to play the game the next day (box and straw).

Children were also asked in three other experiments, what another child would need to play the game "right now" and what they, themselves, needed to play the game "right now" as well as "tomorrow". Further, they compared the "future self" and the "future other" as well as "present-self "and "present-other". Results from these experiments demonstrated that 3-year-olds performed poorly on future questions, 5-year-olds performed well overall and 4-year-olds had a harder time answering correctly when asked what they, themselves will need to play the game in the future, compared to what another person will need.

These results are consistent with Belanger et al.'s (2014) study, suggesting that 3-year-olds were lacking the necessary prospective abilities to be successful in this task, while 4-year-old children may have benefitted from taking a more distanced perspective on this task. Further, the authors explain that the 4-year-olds were discounting the temporal element of the question and answering it as if it were not about the future at all. In other words, the researchers believe that this age group was not focusing on the future aspect of the question, but rather on what was needed and thought of it in a purely functional manner. This "self-other" difference signals a potentially important phenomenon in the development of future oriented thinking that warrants further investigation (as per Lee & Atance, 2016). Furthermore, this difference may indicate that in some instances, it may be easier for children to think about another child's future than it is to think about their own. The benefit of this "other effect" arises from adopting another person's perspective which provides psychological distance from the present self, from one's current desires and physiological states that may bias decision making especially when they conflict with future goals or states (Lee & Atance, 2016).

Although, there have not been any studies that have examined the effect of self-distancing on saving behavior as such, some have demonstrated that psychological distance improves

performance on a variety of delay of gratification and executive function tasks.

For example, in a study conducted by Nisan and Koriat (1977), 5-and 6-year-olds were presented with two delay of gratification questions, one pertaining to the self and the other to a 'smart child'. They were asked the 'self-question': "I have a bag of candies. You may have one candy now, or you may have two candies tomorrow. I will be back tomorrow and will bring with me the bag of candies. So, what would you rather have, one candy now or two candies tomorrow?" (p. 490). And they were asked the 'smart child' question: "Yesterday I was in another kindergarten class and I met (name of child). He/She had to choose between one candy the same day and two candies the next day. He/She is very smart; his teacher thinks he's smart. What do you think he/she chose, one candy the same day or two candies the next day"? (p. 490). Results showed that children indicated that the smart child would delay significantly more often then they decided to delay themselves. In other words, they knew that the 'smart' choice would be to wait until the next day to receive two candies rather than to receive one candy immediately. However, they had difficulty applying this reasoning when asked this same question about themselves.

Similarly, in another study conducted by Prencipe and Zelazo (2005), 3-and 4-year-olds were presented with cards and each would require them to decide whether they should consume the reward immediately or save it until after the experiment. This delay of gratification task consisted of nine trial types, created by crossing three types of rewards (stickers, pennies, candies) and three types of choices (one now vs. two later, one now vs. four later, one now vs. six later). In the "other" condition, the experimenter asked: "What do you think I should do?" and in the "self" condition, they asked: "What do you want to do?" Although 3-year-olds were impulsive and typically chose the immediate reward for themselves, they usually chose the

delayed reward for the experimenter. These results suggest that young children may know that it is beneficial to delay but have difficulty putting this knowledge into action. The authors explain the reason behind this occurrence is based on Barresi and Moore's (1996) model of the development of perspective taking. This model suggests that younger children may make more impulsive decisions when thinking of themselves, because they take an exclusively first-person, present-oriented perspective on their own behavior (Prencipe & Zelazo, 2005). Moreover, they have difficulty adopting a more objective, third-person perspective.

White and Carlson (2016) assessed the influences of graded levels of self-distancing on executive function performance in young children. Three-and five-year olds completed an EF task, in which they were asked to sort cards based on level-specific rules (e.g., sorting by shape and then color). Each level of this task requires inhibition, working memory and set shifting abilities which develop substantially during the preschool years (Carlson, 2012). Participants were randomly assigned to one of four self-distancing conditions: *self-immersed* in which they were instructed to focus on what they are thinking and how they feel when the task gets hard (e.g., "I want you to ask yourself, 'where do *I* think this card should go?'", p. 422); *control* (i.e., no instructions)*; third person* in which they were instructed to talk to themselves using their own name when it gets hard. (e.g., *"*I want you to ask yourself, 'where does (*child's name*) think this card should go?'", p. 422)*;* and *exemplar*, in which they were instructed to pretend they are somebody else who they are told is really good at this game (e.g., "Now you're Batman! I want you to ask yourself 'Where does *Batman* think this card should go?'", p. 422). The researchers hypothesized that psychological distancing would decrease impulsive, stimulus-bound errors and increase flexible, reflective thought required to be successful in this rule-based task-switching measure (as per Carlson, 2016).

Results revealed that EF performance increased as a function of self-distancing in 5-year-olds but not 3-year-olds. Five-year-olds significantly outperformed controls and benefitted from both taking the perspective of an exemplar other (i.e., Batman), and taking a third person perspective. Further, the strongest effects of self-distancing were seen when taking the role of a fictional other, such as Batman. Five-year-olds in this condition performed at a full level above controls which was equivalent to an average of 12 months' development (Carlson, 2012). The researchers claim that role-playing may have contributed to the potency of this result, as children at that age are continuously engaging in pretend play. However, they argue that role-play is not solely responsible for this behavioral change, as 5-year-olds' EF scores also improved significantly when they were asked to view themselves from a different perspective (i.e., third person). This self-distancing strategy, which is often used for emotion regulation with adults (e.g., Kross & Ayduk, 2011; Kross et al., 2014), was also beneficial to young children's EF performance. The researchers explain that the likely reason why younger preschoolers did not benefit from the self-distancing strategy is because they were prompted to alter their mindset about the self in relation to the stimuli, which is a difficult and abstract strategy. According to Carlson and White (2016) considering an outsider's perspective requires the ability to represent another persons' mental state, which is particularly challenging for children under the age of 4. They hypothesized that this type of strategy would become increasingly easier for children as their representational skills, especially their Theory of Mind, continued to develop and become more sophisticated, in the later preschool years. They explored this possibility by analyzing ToM performance (using Wellman and Liu's scale) and found a significant interaction between self-distancing strategy and Theory of mind on EF performance. Overall, EF scores were higher in self- distanced conditions than non-distanced conditions. This was not true for all children,

however, as EF performance did not differ by distancing strategy for children with low ToM scores, there was a large difference among children with high ToM scores. In other words, children with more mature ToM skills performed significantly better in the self-distanced conditions, compared to children with less mature ToM skills.

Given that self-distancing is an abstract concept that requires more sophisticated representational skills, it is possible that one must have acquired a certain level of social understanding before they can successfully take another person's perspective. In addition, children's ability to assume another persona and engage in role play becomes more distinct throughout the preschool years, therefore it makes sense that children with more sophisticated ToM skills were better able to take on the perspective of a fictional person through role play, and thus performed better on the task.

In summary, these studies indicate that older preschoolers (4-and-5-year-olds) benefit more from self-distancing strategies (i.e., taking a third person perspective or reasoning for a socially distant other), compared to younger children (3-year-olds). Further, this work suggests that this difference is likely due to differences in Theory of Mind abilities.

Although there are studies examining the effects of psychological distance on future oriented thinking and executive function tasks, there is no research to my knowledge that has explored the effect of psychological distance on saving behavior with preschoolers. The current study aimed to address this gap, by employing a self-distancing condition, modeled on other studies (White & Carlson, 2016) in which children were instructed to create and implement a savings plan (i.e., budget) for another child who is 'very smart' and 'good at the games' to be played.

In summary, we know that young children are capable of saving and that children's saving behavior benefits from past experience (e.g., Metcalf & Atance, 2011), verbal prompts (e.g., Atance et al., 2017), and the opportunity to budget (e.g., Kamawar et al., 2018). We also know that young children's performance on cognitive tasks, such as the Minnesota Executive Function Scale (MEFS), can benefit from taking on the role of another (psychological distance; White & Carlson, 2016), but it was not yet known whether this will help them in saving situations. Thus, my study employed a variant of the token savings task (described above), and provided some of the participants with the opportunity to create a budget for either oneself or for another person. More specifically, I examined the effect of psychological distance on saving behavior to determine whether it is in fact an effective strategy to increase preschoolers' budgeting and saving performance. In addition, I examined two relevant cognitive factors that are found to play a role in saving behavior (e.g., Planning and Theory of Mind). The current study and its methodology will be described in the following section.

Current study

The aim of the current study was to explore how budgeting for both oneself and for another might improve young children's saving performance on a token-based savings task. The first goal was to determine whether being provided with the opportunity to create a budget for oneself would result in better saving on the token-savings task. The second goal was to investigate whether having children consider how another ought to save (psychological distance) improves saving ability, and whether theory of mind predicts the efficacy of psychological distance. Finally, the third goal was to examine the role of general planning skills in performance on the main savings task.

To address my first goal, I investigated preschoolers' ability to budget using a symbolic

token savings task (Dueck et al., 2019). Though most of the recent work has employed Metcalf and Atance's (2011) marble run savings task which requires young children to save the limited resource itself (i.e., marbles), I chose to use the token saving tasks. There were a number of reasons for this decision. First, the token savings task is more like dealing with money, given its abstract nature, and thus may be more relevant to saving as children get older. Thus, in this proposed study, children were saving tokens which allowed them to 'buy' their preferred reward. In Dueck et al.'s (2019) study, preschoolers demonstrated an understanding of this token economy (i.e., how to both spend, and save their tokens to obtain a reward). Thus, there is some evidence that this task is appropriate to measure saving behavior in young children. An adapted version of this savings task was used in the current study (details about the modifications are outlined below). Second, while research has demonstrated that children can benefit from budgeting when dealing with the marble savings task, nothing is currently known about their ability to budget a more abstract limited resource. Third, and finally, the token savings task is a more practical choice as it is easily transportable, making it possible to collect data where children are (i.e., daycares) instead of requiring parents to come to campus.

To address my second goal, I employed a self-distancing condition in which children were shown a picture of another child and given a bracelet to wear with the other child's name and photo on it. They were asked to pretend they were the other child and create a budget based on that child's preference and then participate in the token savings task *as that child*. This allowed me to examine whether psychological distance (e.g., budgeting for another person instead of oneself) could lead to an increase in saving performance. Although there have been studies examining the effect of psychological distance on temporal discounting with adults (e.g., Malkoc et al., 2010; Rogers & Bazerman, 2008) and delay of gratification tasks with children

(e.g., Koriat & Nissan, 1977; Prencipe & Zelazo, 2005), to the best of my knowledge, this phenomenon has not been examined specifically in a savings task with preschoolers. As previously mentioned, a handful of studies that have examined the effect of psychological distance on children's future-oriented thinking have found that preschoolers who often have difficulty thinking about the future tend to reason better about another person's future than their own (e.g., Belanger et al., 2014; Russel et al., 2010, Lee & Atance, 2016). Thus, this study provides insight into whether the benefits of planning for another (psychological distancing) has the same positive impact on young children's saving behavior.

Further, the relation between Theory of Mind (ToM) and saving performance was examined as it related to the impact of psychological distance. More specifically, I examined how ToM skills play a role in one's ability to create a savings plan, and save, for another person. As previously mentioned, 4- to-5-year-olds show substantial development of ToM which allows them to adopt another person's perspective. Studies have demonstrated that children with a more mature ToM benefit from self-distancing strategies when asked to complete both hot and cool EF tasks (e.g., Wellman et al., 2001; Wellman & Liu, 2004; White & Carlson, 2016). However, to my knowledge, there are not any studies examining relation between ToM and psychological distance, in regard to saving behavior in young children. Moreover, this study tells us whether ToM plays a role in planning to save for another person.

To address my third goal, which was to examine the role of general planning skills in Saving performance, I administered the Truck Loading Task to measure general planning ability in preschoolers. Scores from this test allowed me to examine how general planning skills are related to saving performance (above and beyond the contributions of age and general language ability). It was expected that planning would play a significant role in children's saving ability

because in order to successfully save, one must create a savings plan, and follow through with that plan by managing their current spending, while maintaining their future savings goal. As previously mentioned, Kamawar et al. (2018) found a significant positive correlation between scores on a general planning task (Truck Loading) and the number of marbles children saved in their budgeting condition. In other words, when children were given the opportunity to create a budget, those who were better at planning in general (scored higher on the Truck Loading Task), were also better at saving. Finally, as indicated above, planning skills develop substantially around the same time as does saving behavior (between 3- to 5-years of age). Thus, it is important to examine how this relevant cognitive skill correlates with preschooler's saving performance.

The current study employed a between-subjects design with children randomly assigned to one of the three conditions, each receiving a single trial of the token savings task (as in Atance et al., 2017). In all conditions, the child was given the opportunity to save or spend their 5 tokens across two games, one with less-preferred prizes and one with relatively more-preferred prizes (preferred option always appeared second). In the Baseline condition children were not given the opportunity to create a budget. In the other two conditions, Budget-Self and Budget-other, children had the opportunity to create a budget before engaging in the token task (either for themselves or for another).

Performance on the Baseline condition served as a comparison point. In the Budgeting-Self condition, children received the opportunity to create a savings plan *for themselves* by allocating their tokens between two games. Performance on this condition was used to determine whether: (1) children are able to create a plan to save; (2) children implement their savings plan; (3) children are better able to save for their preferred reward when they have created a savings

plan (in comparison to the baseline condition); and (4) performance on the budgeting component and the actual saving component of the task will be predicted by performance on general planning skills.

In the Budgeting-Other, children were provided with the opportunity to create a savings plan *for someone else* by suggesting how another person (who shares the same preferences as the child) ought to allocate tokens between two games. Performance on this condition was used to determine whether: (1) children are able to create a budget for someone else who has the same preference as them; (2) children save more for the other person while pretending to be them as they play the game; (3) children are better able to save for someone else when they have created a savings plan for them (in comparison to both the Baseline and Budget-Self conditions); (4) children create a more 'mature' or 'beneficial' budget by allocating a greater number of tokens for someone else's preferred game, compared to children in the Budget-Self condition; and (5) performance on the budgeting component and the actual saving component of the task were related to general planning skills and Theory of Mind. The specific hypotheses are described next.

Hypotheses

There were 6 hypotheses for the current study:

1. The first hypothesis was that compared to the Baseline condition, more children in each of the Budgeting conditions would be 'Savers' (i.e., would save at least one token for their preferred game) during the savings task. I expected that children who had the opportunity to create a savings plan in either budgeting condition, would be better able to save as they would be thinking about allocating their tokens prior to playing the first game. The process of considering how to allocate a limited resource, prior to playing the

games, may enable them to reflect on what would be most beneficial to them, and then plan accordingly (as per Kamawar et al., 2018). In other words, when given the opportunity to make an explicit decision to save tokens for their preferred game in the future, I expected more children would likely refrain from spending all their tokens immediately, on the less preferred game. Children in the Baseline condition were not given this opportunity, therefore I expected that fewer children would successfully save at all for their preferred reward.

2. The second hypothesis was that compared to the Baseline condition, children in the Budget-Self condition and children in the Budget-Other condition would save more tokens for their preferred game, relative to children in the Baseline condition. This was expected to be shown by the average number of tokens saved per child in each condition. Given the findings from Kamawar et al.'s (2018) study, I expected that creating a budget (allocating tokens across two games prior to playing the first game) would improve saving behavior.
3. The next hypotheses are about children's plans to save. They are:
    a. More children in the Budgeting-Other condition would be 'Planners' (i.e., would plan to save at least one token for their preferred game) compared to the Budget-Self condition. I expected that children who were asked to think about where another person *should* put their tokens would be more strategic when allocating the tokens compared to those who were just instructed to put the tokens where they want, as in the Budget-Self condition. Based on previous research that demonstrates the impact of psychological distance on future oriented thinking in young children (e.g., Lee & Atance, 2016), I hypothesized that children would be

more deliberate when allocating their tokens, when they were asked to think about one *ought* to do, rather than simply thinking of what they, themselves *want* to do. Taking the perspective of another may have had an influence on their planning behaviour, leading to more adaptive decision making.; and

b. Children in the Budget-Other would create a more *mature* budget (i.e., allocate a greater number of tokens for their preferred game) compared to children in Budgeting-Self condition, who were saving for themselves. I expected this to occur because of research suggesting that adopting another person's perspective, distances oneself from their current desires that may bias decision making (Lee & Atance, 2016). Further, mentally separating oneself from the immediate situation allows for greater control in ones thinking and behaviour and leads to more adaptive reasoning. Thus, I hypothesized that children would plan to save more tokens for their preferred game, when they were asked to take the perspective of another person and think about how that person should save for their preferred reward.

4. The fourth hypothesis was that, within both budgeting conditions, I would replicate the findings from Kamawar et al.'s (2018) study in which they found that children who were Planners (allocating at least one token for their preferred game in their budgets) were more likely to be Savers (saving at least one token for their preferred game). In other words, not only being provided with the opportunity to budget but actually budgeting would help them to save (as per Kamawar et al., 2018).
5. The fifth hypothesis was that there would be a significant positive correlation between performance on the Truck Loading task and the number of tokens saved for their more-

preferred prize, in both budgeting conditions. I expected this to occur given the findings from Kamawar et al.'s (2018) study in which children's Truck Loading scores, in the budgeting condition, were significantly correlated to the number of marbles they saved for their preferred marble run. In other words, when given the opportunity to budget, I hypothesized that children who were better at planning in general saved more tokens for their preferred prizes. I expected this pattern of results to appear in the current study for children who were budgeting for self and for those budgeting for other, when comparing to performance on the baseline condition (as per Kamawar et al.)

6. The sixth hypothesis is exploratory in nature, due to the small sample size for this condition. This final hypothesis was that Theory of Mind (ToM) would account for a significantly greater amount of variance in performance in the Budget-Other condition compared to the Budget-Self condition. In other words, children in the Budget-Other condition who scored higher on the Theory of Mind scale would save more tokens for their preferred game. Those with more advanced ToM skills would likely benefit more from psychological distance when asked to save for another person. I expected this to occur given the findings from White and Carlson's (2016) study, as children who scored higher on the Theory of Mind scale benefited from taking a self-distanced perspective on an executive function task (i.e., among children with high ToM scores, those in self-distanced conditions scored higher on the EF task, compared to those in non-distanced conditions).

Method

Participants

A total of 75 three-to- five-year-olds (33 females and 42 males) were recruited from 8 child care centres around Ottawa, Ontario to participate in this study. After receiving ethics clearance, informed consent was obtained from daycare directors before consent forms, explaining the study, were distributed to parents. Before beginning each testing session at the daycare, written consent was obtained from the parents (Appendix A) and verbal assent from the children. All children were informed that they could end a task or the testing session at any point. Researchers were also alert for children who were upset or appeared in distress and ended the testing session if necessary (even if the children do not request it). Regardless of the number of tasks completed, each child was given all the stickers and toys at the end of the session to thank them for their participation. Further, daycares were provided with a book for the classroom as a way to thank them for their participation.

Procedure

Participants were randomly assigned to one of three conditions of the Savings paradigm: Baseline, Budgeting-Self, and Budgeting-Other. There were 24 participants in the Baseline condition (6 females), mean age (in months) = 55.17, SD= 7.14; 25 participants in the Budgeting-Self condition (14 females), mean age (in months) = 58.68, SD= 8.33; and 26 participants in the Budgeting-Other condition (13 females), mean age (in months) = 59.92, SD= 6.20. They participated in two 15-20 minute testing sessions, measuring their saving ability, Theory of Mind, general planning skills, and general language ability. The sessions were completed on two separate days, an average of a week apart. Children were tested individually, in a quiet corner of the classroom. During the first session, children were asked to complete the

first two ToM scale items, the Savings task and the Truck Loading task, respectively. During the second session, they were asked to complete the last four ToM scale items, and the PPVT-III (to control for general language ability).

Measures

Saving Paradigm.

Two different colored trays, containing either small toys or stickers, were used during the Saving Paradigm (see Appendix C for photo; task adapted from Dueck et al., 2019). There are three versions of this paradigm: (1) the Baseline condition which is very similar to Dueck et al.'s (2019) token saving task and evaluates whether children are able to save for their more preferred reward; (2) the Budgeting-Self condition, which replicates and expands upon Kamawar et al.'s (2018) study; and (3) the Budgeting-Other, which is designed to evaluate whether psychological distance affects budgeting and improves saving behaviour. I evaluated saving performance across each condition.

All Conditions

Participants were first introduced to two games: The *Toys game* on a blue tray, and the *Stickers game* on a green tray. The blue tray contained 10 different small toys and the green tray contained 10 different stickers. Each tray also contained a small box in the same colour as the tray, in which the child put their tokens. First, the children completed a preference check to determine the order in which they would play the games. They were first asked to pick the five stickers that they liked the most and put them into a small green bowl and then were asked to pick the five toys that they liked the most and put them into a small blue bowl. This was done to ensure that there was an appealing option for the child in each game. The experimenter then picked one sticker they 'liked the most' and one toy they 'liked the most' from the unchosen

items and put them into the appropriate bowls. The small bowls containing 6 prizes each were placed on their corresponding trays while the rest of the toys and stickers were put away. Children were then asked to pick which type of prize they liked more (choosing between their preferred stickers and their preferred toys). This was done to ensure that the child would first play the game that had their less-preferred prizes, followed by the game that had their more-preferred prizes (see Appendix D; Note that the Protocol indicating stickers as the preferred prize, is the same as the protocol displayed in appendices D through G, but presented in opposite order).

Next, the experimenter placed 7 tokens on the table in front of the child, equidistant from both trays. The experimenter explained that one token gets them one prize and that once they put a token in the box, they cannot take it out because it is 'all used up'. The researcher then demonstrated how to play both games by placing a token in the box and taking a prize (the sticker or the toy selected by the experimenter). They then put these prizes into a covered white box (the experimenter and the child each had their own box). The experimenter explained to the child that when they got prizes they must put them into their own box and that is where they have to stay. This was done to ensure that the child was not distracted by the prizes while they were playing the games. At this point, there was 5 tokens remaining on the table (they were placed on the table in front of the child, spread out in a single line, centered in front of the child).

At this point, the administration of the Savings task varied by condition. The details for each condition are described in turn.

Baseline Condition

The experimenter then explained to the participating child that they only have the 5 tokens to use for both games. Children then spent 3 minutes playing each game, beginning with

their less-preferred game (See Appendix E for full protocol). Only the game that the child was currently playing was on the table at a given time. The experimenter was present during this time and pretended to be doing paperwork beside them (on a clipboard). If the children addressed the experimenter, they responded with neutral statements such as "I have to do my work over here." The experimenter documented the number of tokens saved for the child's more-preferred game, which was used in the main analysis. Further, children were coded as Savers if they saved at least one token for their more-preferred game and Non-Savers otherwise.

Children were allowed to keep all the preferred toys and stickers at the end of their testing session. These prizes were enclosed in an opaque envelope with their name on it and given to the classroom teacher to hold onto, until the end of the day, when the children were ready to go home.

Budgeting Condition 1: Budgeting-Self. [1]

After the common introduction to the token task, participants were shown both trays on the table in front of them. The experimenter placed a small basket (one blue and one green) in front of its colour-corresponding tray and placed the 5 tokens, in a line on the table, between both trays (See Appendix F for full protocol). The child was told: "For this game, we need two baskets. This (green) basket is where you put tokens you want to use in the stickers game. This (blue) basket is where you put tokens you want to use in the toy game. Remember, you have these five tokens. Okay, now you can choose how many of the tokens you want for the stickers game and how many of the tokens you want for the toys game. Here they are! You can use these baskets for your tokens." They were then allowed to place the number of tokens they wanted to

[1] The original version of the Budgeting conditions was revised to ensure that children understood how to create their budget (i.e., how to allocate their tokens into the baskets corresponding to each game). The pilot data was not included in the analysis.

use for each game in the colour-matched baskets in front of the corresponding trays. The experimenter then removed the more-preferred game and left the less-preferred game on the table, along with *both* of the token baskets (centered in front of the tray) and completed the savings task as it is run in the Baseline condition. If there were leftover tokens that were not placed in either basket, they were left on the table as well. As in Kamawar et al.'s (2018) study, participants had access to their budgeting plan (the separated number of tokens in each basket) while playing the games, to allow them to deviate from their savings plan. The experimenter did not use words like 'save' or 'plan' and did not provide any feedback on the children's budgeting plans. The experimenter documented: (a) the number of tokens planned for each game (as indicated by their allocation of tokens to each basket); and (b) the number of tokens that were actually saved for the preferred game (for use in the main analysis). Children were also coded as Savers if they saved at least one token for their preferred game and Non-Savers otherwise. Additionally, children who planned to save at least one token for their preferred game were coded as Planners, and Non-Planners otherwise.

Budgeting Condition 2: Budgeting-Other.

After the common introduction to the token task, participants were asked to budget for another person rather than themselves (See Appendix G for full protocol). The other person was described as having the same preferences as the participant. At this point, the participants were shown a picture with a gender-neutral child on it and told: "This is Sam[2], Sam is very smart! Sam is going to play these games another day soon. I already showed Sam the prizes. When I showed them the stickers, Sam liked these stickers (the child's preferred stickers), just like you!

[2] The name 'Sam' was chosen because it is not exclusively associated with any particular gender. The photo of Sam will be of a child who does not obviously appear to be any particular gender. This choice was made to avoid trying to match the participating child's gender and try to be more inclusive.

When I showed Sam the toys, they liked these toys more (the child's preferred toys), just like you! Sam also liked the (stickers/toys) more than the (stickers/toys), just like you!". Then they were told: "I want you to pretend that you are Sam when you play these games, okay?". Then, the children will be given a bracelet to wear with Sam's name and photo on it. "Now, you're Sam! In this game, I want you to ask yourself, 'Where should Sam put these tokens?' Now remember, Sam is just like you and like the toys more. And remember, Sam is very smart and good at these kinds of games! Here are the tokens. Go ahead, put them in!"

Children were then asked to put the number of tokens they thought Sam should use for each game in the colour-matched baskets in front of the corresponding trays. "You can choose how you use your tokens. Remember, the green basket is for the tokens for the stickers game and the blue basket is for the tokens for the toys game. Go ahead and put them in!"

As in Condition 1, participants had access to their budgeting plan (the separated number of tokens in each basket) while playing the games, to serve as a visual reminder. The experimenter did not use words like 'save' or 'plan' and did not provide any feedback on the children's budgeting plans. The experimenter removed the more-preferred game and left the less-preferred game on the table, along with the baskets (centered in front of the tray) and completed the savings task as it is run in the Baseline condition. The experimenter documented: (a) the number of tokens planned for each game (as indicated by their allocation of tokens to each basket); and (b) the number of tokens that were actually saved for the preferred game. Children were coded as Savers if they saved at least one token for their preferred game and as Non-Savers otherwise. Additionally, children who planned to save at least one token for their more-preferred game, were coded as Planners and as Non-Planners otherwise. All of these scores were used in the analyses.

Planning measure.

Truck Loading. The Truck Loading task was used to measure general planning ability in young children (Carlson et al., 2004; Fagot & Gauvain, 1997; see Appendix H for full protocol). During this task, children take on the role of a mail carrier that delivers color coded party invitations to five colorful homes on one side of a one-way street. The children are asked to load up the delivery truck with the invitations. The delivery task requires that the colour of the invitation and the house match and the invitations must only be taken from the top of the pile. Moreover, children must engage in planning and in order to succeed on the task, they were required to load the invitations in the correct order. In other words, they should start by loading the invitation that will be delivered last. The task consists of four levels of difficulty beginning with two houses and ending with five houses, with up to two tries per level.

First, the experimenter performed a color check by naming a color and asking the child to point to the appropriate colored sheet on the table. Then, the experimenter explained that each invitation goes to the matching colored house and that they must load up the truck. Children were shown that the truck must drive around the one-way street and follow the arrows. They then heard about the rules of the game. More specifically, they were told, "We need to put the invitations in the back of the truck so that the top invitation goes to the house that you are driving by. You always have to take the invitation off the top of the truck so that the top invitation goes to the first house and the next invitation goes to the next house." Before the child started the game, the experimenter performed a memory check. They said, "Now there are two houses that we want to invite to the party. The yellow invitation goes to the yellow house and the purple invitation goes to the purple house. So first let's put in the purple invitation and then put in the

yellow invitation. Now, remember, we can only take an invitation from the top of the truck. We can never take an invitation from the bottom of the truck.". They then asked, "So, can I take one from the bottom like this? No Way!"

If the child does not pass a level on the first try the experimenter reminded them of the rules and asked the child to try again. Children moved onto the next level if they successfully delivered the invitations on the first or the second attempt. Total scores range from 0 to 4, with children receiving a score of 1 for each level correctly completed. This score was used in the analyses.

Theory of Mind.

Theory of Mind Scale. Wellman and Liu's (2004) battery of Theory of Mind tasks provides a developmental scale of ToM understanding for preschoolers, 3-to-6 years of age. This scale includes six tasks that assess children's understanding of diverse desires, diverse beliefs, knowledge access, false belief and real-apparent emotion (See Appendix I). Theory of mind scores were created by summing the number of tasks that they passed (0-6). This score was used in the analyses.

Receptive language.

Peabody Picture Vocabulary Test-3rd Edition (PPVT-III). The PPVT-III (Dunn & Dunn, 1997) is a standardized measure of receptive vocabulary. Given that all tasks in this study involve verbal instructions, and responses, participant's scores on the PPVT-III were used to statistically control for differences in general language ability in the analyses. In this task, children see arrays of four pictures, hear the name of one of them and have to point to the appropriate picture (See Appendix J for full protocol). The task is arranged in blocks of 12 words (with increasingly difficult vocabulary), and in its standard administration, formal basal and ceiling rules dictate where testing begins and ends. In the current study, an abbreviated

version was used to reduce the administration time (see Skwarchuk, Sowinski & Lefevre, 2014; Vendetti, Kamawar, & Andrews, 2019). All children started at Set 3 (the start point for 5-year-olds) and stopped when they committed eight or more errors in a set, or at the end of Set 11 (whichever came first). The total number of correct items was used to calculate the raw score. Children's raw scores were used in the analyses.

Results

Preliminary Analyses

An alpha of .05 was used for all statistical analyses. All participants completed all of the measures. The descriptive statistics for the measures considered in the analyses are displayed in Tables 1 and 2. Preliminary analyses were conducted prior to examining performance on the savings task to determine whether the participants were matched across conditions. More specifically, a series of one-way analyses of variance (ANOVA) were conducted to test for any significant differences across the three groups of participants (Baseline, Budgeting-Self and Budgeting-Other) in terms of their age (measured in months), Truck Loading performance, Theory of Mind performance, and general language (PPVT-III) scores. Results revealed no significant between group differences on these measures (See Table 3). Therefore, these variables were not controlled for in the following analyses.

Table 1

Means and Standard Deviations on Ages and Measures

	Across All Conditions	
	Mean	SD
Age (in months)	58.0	7.44
Tokens Saved (out of 5)	2.24	1.68
ToM – total (out of 7)	4.43	1.73
Truck Loading (max of 4)	3.0	1.24
PPVT-III (raw)	50.36	15.70

Note: N=75

Table 2

Means and Standard Deviations on Ages and Measures by Condition

	Baseline (*n*= 24)		Budgeting-Self (*n*=25)		Budgeting-Other (*n*=26)	
	Mean	SD	Mean	SD	Mean	SD
Age (in months)	55.17	7.14	58.68	8.33	59.92	6.20
Tokens Saved (out of 5)	1.33	2.01	2.36	1.35	2.96	1.25
ToM total (out of 7)	4.04	1.90	4.64	1.80	4.58	1.47
Truck Loading (max of 4)	2.79	1.25	2.96	1.20	3.23	1.27
PPVT-III (raw)	46.29	15.35	52.72	12.04	51.85	18.70
Deviation score	----	----	-.48	1.87	-.46	1.47

Note: Deviation Score= number of tokens budgeted for preferred game - number of tokens saved for preferred game.

Table 3

Analysis of Between Group Differences on Age and all Common Measures

Measure	*F*	*p*
Age (months)	2.85	0.06
ToM	0.88	0.42
Truck Loading	0.80	0.46
PPVT-III	1.21	0.30

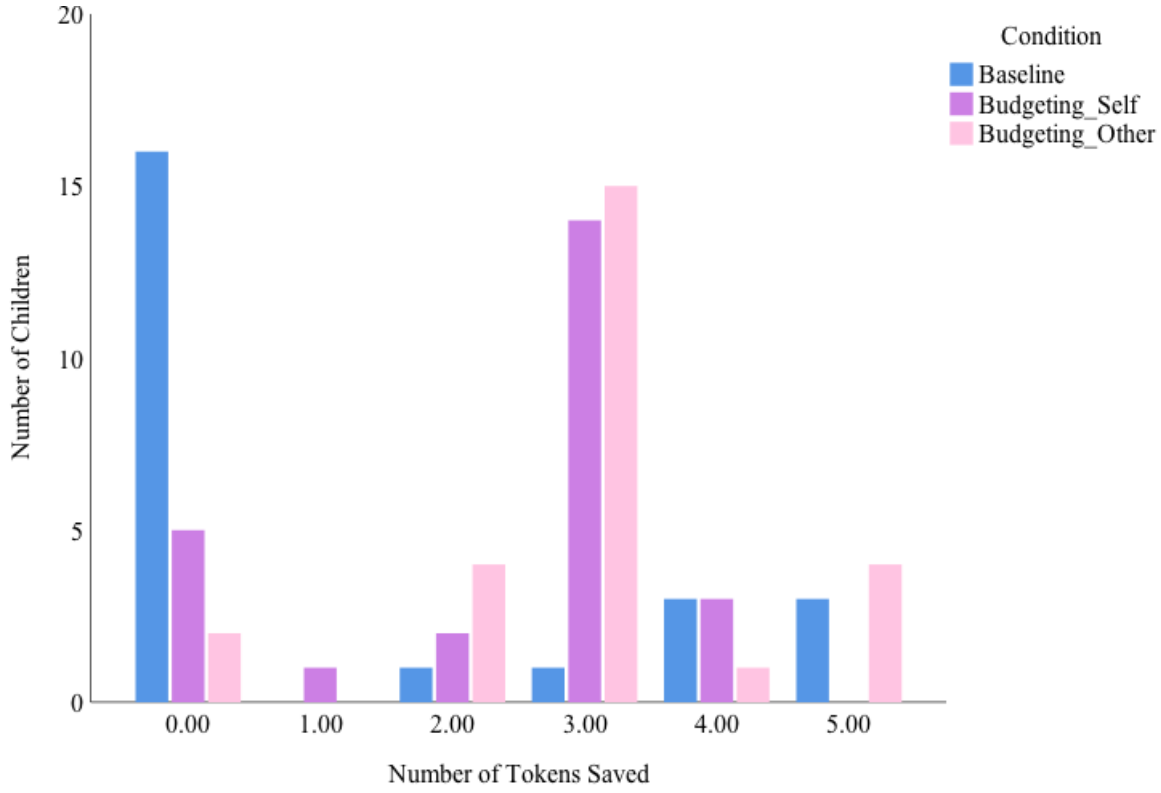
Note: N=75

Performance on the Savings Task

Of the 75 children who completed the Savings task, 36 preferred stickers and 39 preferred toys when completing the preference check. The distribution of tokens saved for the preferred game, per condition, is shown in Figure 1.

Figure 1.

Distribution of the Number of Tokens Saved by Condition



Recall that children were classified as either savers (saved at least one token for the second game) or non-savers (did not save any tokens for the second game). A Chi-square analysis was conducted to test my primary hypothesis, that a greater number of children in the budgeting conditions would save at least one token for their preferred game, compared to the Baseline condition. The groups were compared to determine whether significantly more participants in the budgeting conditions were savers as compared to the Baseline condition (see Table 4). This test of independence assessed whether an association exists between the two variables by comparing the observed pattern of responses in the data to the pattern that would be expected if the variables were truly independent of each other. Therefore, the Chi-Square distribution allows one to determine whether the observed cell counts are significantly different from the expected

cell counts. Each expected count was calculated using this equation: ((Total number of Savers across all conditions x total number of Savers and Non-Savers in one particular condition) / N). Results from the overall Chi-Square indicated that condition was not independent of saver status, χ^2 (2, N =75) = 22.42, p =.001. This means that the observed count was significantly different from the expected count and that a relationship exists between the two variables (i.e., condition and saver status). Because the omnibus chi-square value does not specify which groups contribute to the statistical significance, an *a priori* test was conducted to compare the three conditions. As shown by the subscript letter attached to the count for savers and non-savers in each condition in Table 4, both Budgeting-Self and Budgeting-Other differ significantly from Baseline. However, Budgeting-self and Budgeting-other do not differ significantly from each other. In line with my hypothesis, these results indicate that there were significantly more savers in the budgeting conditions compared to the Baseline condition. The proportion of savers did not differ significantly between the budgeting conditions.

Table 4.

Saver Status by Condition Cross tabulation

Saver Status		Baseline	Budgeting-Self	Budgeting-Other
Non-saver	Count	16_a	5_b	2_b
	Expected Count	7.4	7.7	8.0
Save	Count	8_a	20_b	24_b
	Expected count	16.6	17.3	18.0

Note. Each subscript letter denotes a subset of condition categories whose proportions do not differ significantly from each other at the .05 level.

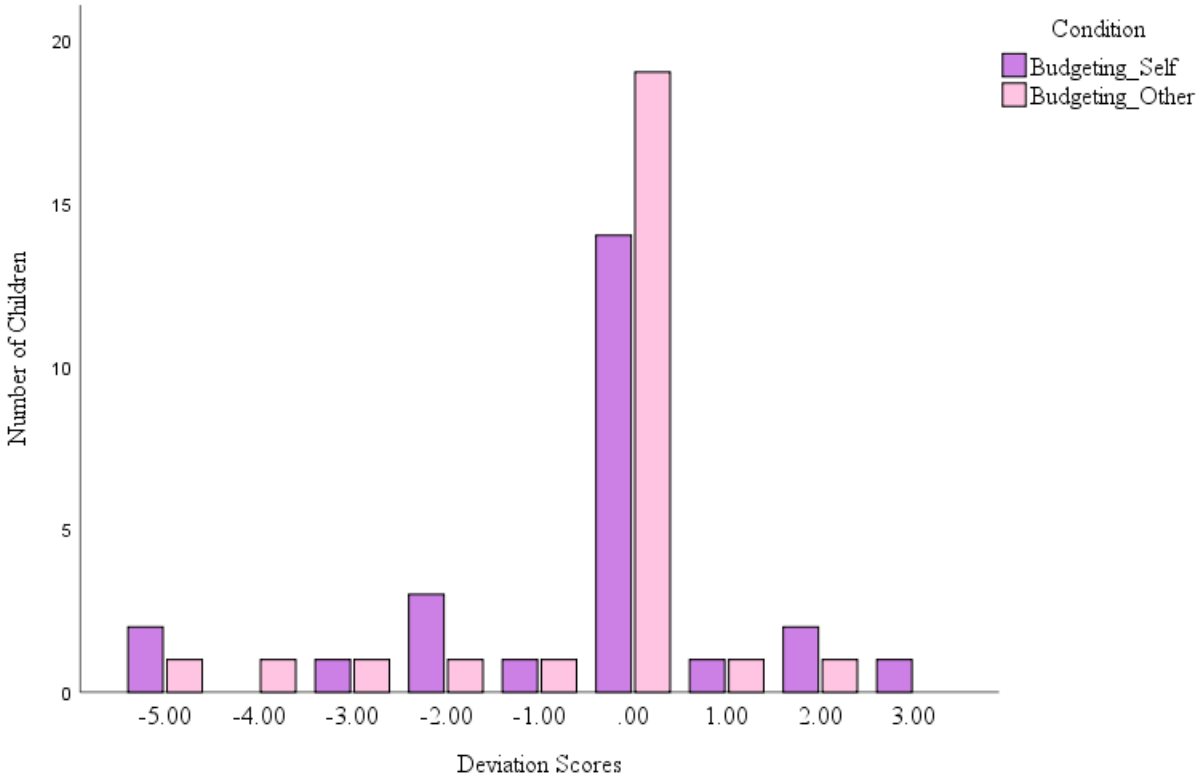
A One-Way ANOVA was conducted to test my second set of hypotheses, that: a) children in the Budgeting-Self condition would save more tokens for their preferred game relative to children in the Baseline condition; and b) children in the Budgeting-Other condition would save more tokens for their preferred game relative to children in the Baseline condition. Participants in the Baseline condition saved 1.33 tokens on average for their preferred game, those in the Budgeting-Self condition saved an average of 2.36 tokens, and those in the Budgeting-Other condition saved an average of 2.96 tokens. Each of the main ANOVA assumptions were satisfied, therefore the test could be run normally without corrections. The independent variable was condition and the dependent variable was number of tokens saved for the second game. Results indicated a significant main effect of condition on number of tokens saved F (2,75) = 6.88, p = .002. A Bonferroni multiple comparison test was conducted to examine between-group differences. Results from these post-hoc tests indicated that participants in the Budgeting-Other condition saved significantly more tokens for their preferred game, (M= 2.96, SD = 1.24), p = .001, compared to the Baseline condition, as hypothesized. Contrary to my hypothesis, participants in the Budgeting-Self condition did not save significantly more tokens, (M=2.36, SD= 1.35), p=.074, compared to the Baseline condition.

Deviation scores were also calculated to determine the difference between the number of tokens children allocated for their preferred game and the number they actually saved for their preferred game. A positive deviation score indicated that a child budgeted more than they saved, a negative deviation score indicated that a child saved more than they budgeted, while a score of zero indicated that they stuck exactly to their budget. Results displayed in both Table 2 and Figure 2, show that children in the Budgeting-Self condition deviated slightly more from their

budget on average, compared to those in the Budgeting-Other condition. Overall, the majority of children did not deviate from their budget.

Figure 2.

Distribution of Deviation Scores by Budgeting Condition, N=51



A Chi-Square analysis was conducted to test part one of my third hypothesis that more children in the Budgeting-Other condition would be planners (i.e., would plan to save at least one token for their preferred game) than non-planners, compared to the Budgeting-Self condition. Within the two budgeting conditions, 46 children were planners and five were non-planners. Due to the small number of non-planners, the Chi-square assumptions were violated. Specifically, 2 cells (50%) had expected count less than five with a minimum expected count of 2.45. Although the results indicated that these variables were not independent from each other, the Chi-square test was not robust enough given the distribution of the data, and therefore could

not be used. As an alternative approach, a logistic regression was conducted to determine whether condition was a predictor of planner status. The statistical significance of an individual regression (i.e., β) was tested using the Wald Chi-square statistic coefficient (Peng et al., 2002). Results indicated that there was not a significant difference in the number of planners between the budgeting conditions, χ^2 (1, N =51) = .179, p =.673. However, it is worth noting that only five children were classified as non-planners across the two conditions. The distribution of Planner Status by condition is displayed in Table 5.

Table 5.

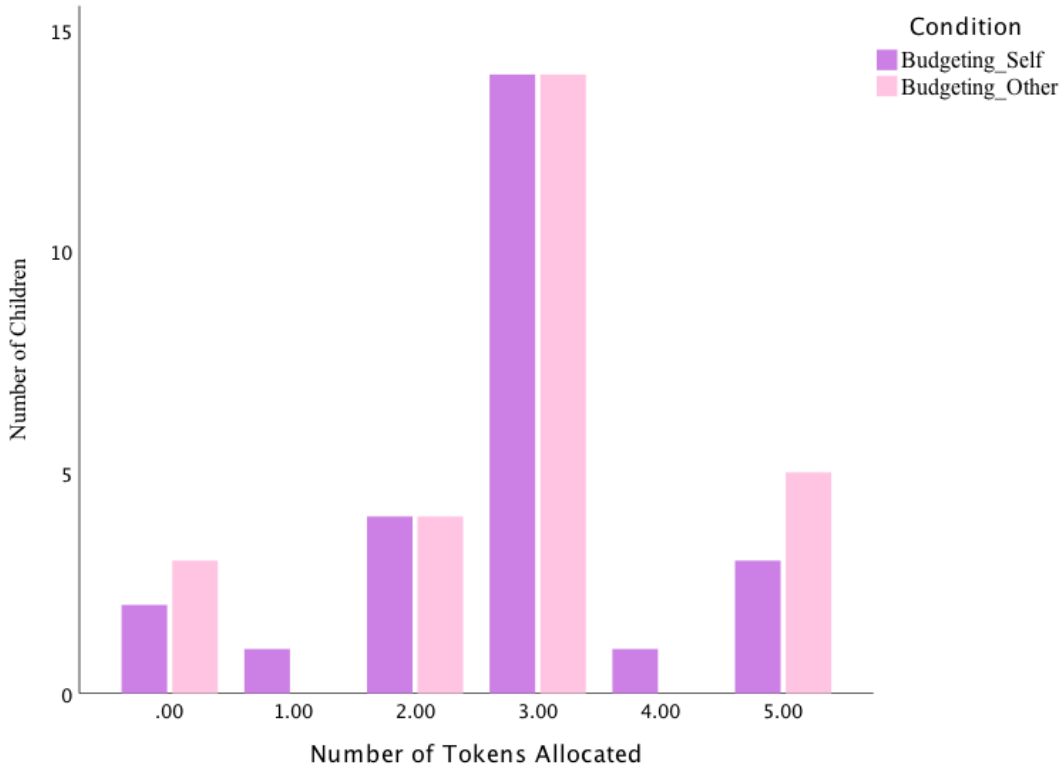
Number of Planners and Non-Planners by Budgeting Condition

Condition (Group Size)	Planners	Non-Planners
Budgeting- Self (25)	23	2
Budgeting-Other (26)	23	3

An independent samples t-test was conducted to test part two of my third hypothesis that children in the Budgeting-Other condition would create a more mature budget (i.e., budget a greater number of tokens for the preferred game) compared to children in the Budgeting-Self condition. In this case, the independent variable was condition and the dependent variable was the total number of tokens allocated for the preferred game. Support was not found for this hypothesis, F (49 ,51) = .106, p =.823, with results indicating that there was not a significant difference in the average number of tokens allocated between the two budgeting conditions. The distribution of tokens allocated for their preferred game, by condition, is displayed in Figure 2.

Figure 3.

Token Allocation by Children in Budgeting Conditions, N= 51



A Chi-Square Analysis was conducted to examine my fourth hypothesis that within both budgeting conditions, children who were planners were more likely to be savers (i.e., those who budgeted at least one token for their preferred game also saved at least one token for their preferred game). Once again, due to the small number of non-planners and non-savers, the Chi-square assumptions were violated (see Table 6 for the distribution). Specifically, 2 cells (50%) had expected count less than five with a minimum expected count of 2.45. Although the results suggested that these variables were not independent from each other, the Chi-square test was not robust enough given the distribution of the data, and therefore could not be interpreted as meaningful. As an alternative approach, a logistic regression was conducted to determine whether planner status was a predictor of saver status. The statistical significance of an

individual regression (i.e., β) was tested using the Wald chi-square statistic coefficient. Results indicated that planner status was a significant predictor of saver status, χ^2 (1, N =51) = 6.865, p =.009, meaning that as planner status increases (i.e., transforms from non-planner to planner), saver status also increases (i.e., transforms from non-saver to saver). This result is in line with my hypothesis, however it is important to note concerns with the distribution as only 5 children were non- planners and 7 were non-savers in the two budgeting conditions.

Table 6.

Distribution of Planner Status by Saver Status within the Budgeting Conditions

		Planning Status		
		Non-Planner	Planner	Total
Saver Status	Non-Saver	3	4	7
	Saver	2	42	44
Total		5	46	51

A two-tailed partial correlation was run in which age (in months) and general language ability (PPVT-III raw score) was statistically controlled, to determine if the total number of tokens allocated for the preferred game was correlated with the total number of tokens saved for the preferred game, within each budgeting condition. Results were not significant in either budgeting condition (Budgeting-Self: r = -.131, p = .551, Budgeting-Other: r = .34, p = .101).

General planning

To test my fifth hypothesis examining the predicted positive correlation between performance on the Truck Loading task (general planning ability) and saving behaviour (number of tokens saved), a partial correlation was run in which age (in months) and general language ability (PPVT-III raw score) was statistically controlled. Both the partial correlations across the

entire sample, as well as within each condition, was examined to determine the degree to which general planning ability predicted saving performance (number of tokens saved). There was a marginal partial correlation between scores on the Truck loading task and number of tokens saved for the second game, across all conditions, $r = .23$, $p = .055$ (two-tailed). However, the partial correlations within condition were not significant (Baseline: $r = .39$, $p = .071$, Budgeting-Self: $r = .36$, $p = .096$, Budgeting-Other: $r = .07$, $p = .753$).

Theory of Mind and Psychological Distance

A partial correlation, in which age in months and language ability were statically controlled, was conducted to test for the relation between ToM performance and saving behaviour (number of tokens saved). This analysis investigated the sixth hypothesis, that children in the Budgeting-other condition, who scored higher on the Theory of Mind scale, would benefit more from psychological distance compared to those who scored lower (as per White & Carlson, 2016). Results indicated that neither of the partial correlations between Theory of Mind scores and total number of tokens saved were significant within the budgeting conditions (Budgeting-self: $r = .07$, $p = .746$, Budgeting-other: $r = .41$, $p = .174$). Contrary to my hypothesis, there was not a significant difference between these partial correlations as tested by the Fisher r-to-z test ($z = 0.8$, $p = 0.423$).

Discussion

The goal of the present study was to explore how budgeting for both oneself and for another might improve young children's saving performance on a token-based savings task. The first goal was to determine whether being provided with the opportunity to create a budget for oneself would result in better performance on the savings task, as compared to not having such an opportunity. To address this goal, children in the Budgeting-Self condition were given the opportunity to create a budget for themselves, by allocating a limited number of tokens into baskets prior to participating in the savings task. The second goal was to investigate whether having children consider how another ought to save (i.e., increasing psychological distance) improves saving ability, and whether theory of mind predicts the efficacy of psychological distance. To address this goal, children in the Budgeting-Other (self-distancing) condition were given the opportunity to create a budget for another child named Sam who is "smart" and "good at these kinds of games", and has the same preferences as the child. Participants were asked to pretend they were Sam and to allocate their tokens into the baskets prior to playing the games. They were asked to think about how many tokens Sam should use for each game. Finally, the third goal was to examine the role of general planning ability in performance on the main savings task.

It is important to note that the current study was not a replication, but rather an extension of Kamawar et al.'s (2018) study and it employed a different type of savings task while investigating the benefits of budgeting. More specifically, instead of using marbles, this study used a more abstract representation of a limited resource that is similar to money (i.e., tokens). Therefore, this study provides the novel finding that children have the ability to budget a more abstract limited resource.

There was support for my first hypothesis that more children in the budgeting conditions would be savers compared to the Baseline condition. Specifically, there were significantly more savers in the Budgeting-Self condition compared to the Baseline condition (in line with Kamawar et al., 2018), and significantly more savers in the Budgeting-Other condition compared to the Baseline condition, with no difference between the two budgeting conditions. Therefore, this study provides the novel finding that children's saving can benefit from budgeting, even when dealing with a symbolic representation of the resource.

This finding is interpreted to mean that the budgeting conditions allowed children to consider how they would like to spend their tokens and allocate them between the two baskets, thereby creating an explicit plan (i.e., budget). These results indicate that the opportunity to create a budget contributed to children's ability to save at least one token for their preferred game. Thus, it seems that being presented with the opportunity to budget helped children more carefully consider their options and behave in a way that was beneficial to their future selves. Alternatively, or additionally, it is possible that by leaving the baskets (with the budgeted tokens) out on the table in front of the games, children were reminded of their plan when they were faced with temptation to use all their tokens during the first game. If so, it may be the case that children benefitted both from having come up with a plan to save *and* being reminded of that plan. It is worth noting that other studies have found that children have benefitted from a verbal prompt to think about saving their limited resource (marbles) without a visual reminder (Atance et al., 2017). Thus, this may not necessarily be the driving benefit of budgeting. However, this thesis was not designed to distinguish between these options, but future work could explicitly investigate this possibility by comparing the performance among my budgeting conditions (with a visual reminder) with a budgeting condition without a visual reminder. For example, it could

include a condition in which children are given a chance to allocate their tokens beforehand, however when it comes time to play the savings game, their tokens are all laid out in a line on the table in front of the game. This could help determine to what degree children benefit from the visual reminder, and if they benefit from the act of budgeting on its own, before playing each game.

Partial support was found for the second hypothesis that children in the Budgeting-Self and Budgeting-Other conditions would save more tokens for their preferred game relative to the children in the Baseline condition. As hypothesized, children in the Budgeting-Other condition saved significantly more tokens for their preferred game compared to children in the Baseline condition. Contrary to my hypothesis, children in the Budgeting-Self condition did not. This result was unexpected, as previous research has shown that creating a budget for oneself has a significant, positive effect on saving. Specifically, Kamawar et al. (2018) found that children in the budgeting condition saved significantly more marbles for their preferred run compared to those in the Baseline condition. It is possible that the lack of significance is due to an underpowered sample size. In order to obtain 80% power, each condition requires n=36 participants to create a total sample size of N=108 participants, and the current study only has 75 participants.

Another possible explanation for this result is that the participants' preferred prize was made more salient in the Budgeting-Other condition. Specifically, in the Budgeting-Other condition, children were told that Sam (i.e., the other child) picked the same stickers/toys as them, and that Sam liked the stickers or toys better, just like them. This was said right before they played the first game, whereas their favorite prize was not mentioned again in either of the other two conditions. With this reminder, their preferred prize may have been more salient in

their mind and this may have had an influence on how they saved their tokens. In the other two conditions, they may not have been thinking as much about their favorite prize, and were just eager to play the first game. On a similar note, it may have been the difference in the way they were asked to budget in the Budgeting-Other condition that contributed to this result. In the Budgeting-Other condition, children were told "...I want you to ask yourself, " Where *should* Sam put these tokens...?" while in the Budgeting-Self condition, children were told "...You can choose how many tokens you *want* for the stickers game and how many tokens you *want* for the toys game..." Note that the spoken emphasis did not differ when the children heard the instructions. The italics are here to make clear the differences in wording. Thus, it could be that the instructions played a role in how children thought about saving (i.e., being asked what they should do). In the Budgeting-Self condition they were likely thinking about what they wanted to do, similar to Baseline (except with the opportunity to budget); however, in the Budgeting-Other condition, there was a deeper level of thought required to decide what the "right" thing to do is.

Future research should consider using the same instructions for both budgeting conditions. For example, researchers should say either "want" or "should" when asking them to think about how to allocate their tokens in both conditions. However, it would make more sense to ask them how Sam 'should', rather than 'wants', to allocate their tokens because they do not know Sam and therefore may not know how to answer that question. If children in both the Budgeting-Other and Budgeting-Self conditions are asked to think about how they *should* allocate their tokens, this would rule out the possibility that the way in which they are being asked to budget is influencing their saving behavior.

It is worth noting that there was not a significant difference in the number of tokens saved between the two budgeting conditions, therefore it cannot be argued that Psychological distance

played an important role in the number of tokens saved, because children who had created a budget for another person did not save significantly more tokens than children who had created a budget for themselves (i.e., did not receive the self-distancing condition). It is possible that the psychological distancing manipulation did not have the desired effect. For example, it is possible that children did not get into the role of 'being Sam'. The fact that Sam was a child of around the same age and the children were not given much background information about them, may not have had as much of an influence on their incentive to save. In White and Carlson's (2016) study, children were able to completely dress up as Batman, a character they knew and looked up to and asked to take his perspective, which may have been more motivating to them. It could be that the Sam character was too similar to the child and that they needed more than just a picture and bracelet to wear in order to fully embrace the role-play. Perhaps increasing the degree of self-distancing would have a larger impact on their saving behaviour. This could be done by having the children dress up more and act as the other child through role-play and answering questions about them. If this results in improved performance, this could have interesting implications for parents and teachers. For example, when teaching children about ways to benefit their saving behaviour, self-distancing strategies, such as considering how another person "ought" to save, should be considered. It would also have implications more generally for having children engage in self-distancing strategies to improve performance.

I also did not find support for my hypothesis that more children in the Budgeting-Other condition would be planners, rather than non-planners, compared to the Budgeting-Self condition, as there was no significant difference in the number of planners between the conditions. However, it is worth noting that there were only 2 non-planners in the Budgeting-Self condition and only 3 in the Budgeting-Other condition. The small number of non-planners

makes it difficult to interpret this lack of finding. It is possible that they felt obliged to put at least one token into each of the baskets, regardless of their preference, simply to show that they were following instructions.

This finding raises the question of what the ideal number of tokens is that a child should allocate towards their preferred game. For example, should someone who plans to save at least one token (out of five) for their preferred game be classified as a planner (as I have done in this study, and was done in Kamawar et al., 2018 and Metcalf & Atance, 2011), or should it be someone who plans to save the majority of the tokens (i.e., 3 or more out of five) for their preferred game? The first option demonstrates at least a minimal ability to consider the future, while it could be argued that the second option demonstrates a more 'optimal' plan as it results in the majority of one's tokens being spent on the more desired items. Given this alternative consideration employing a more stringent requirement, I re-examined performance after first classifying children who allocated three or more tokens as planners and those who did not as non-planners. While this did increase the total number of non-planners to 14 (seven in each condition), there was still no difference in planner status between the two budgeting conditions, χ^2 (1, N =51) = .007, p =.931. The reason for this result is unclear. It may be that this group of children was particularly skilled at planning. It may also be that Budgeting-Other and Budgeting-Self were simply not different, with the mean number of tokens saved being just enough higher in the Budgeting-Other condition to result a significant difference between Budgeting-Other and Baseline.

These findings did not support my hypothesis that children in the Budgeting-Other condition would create a more mature budget (i.e., budget a greater number of tokens for their preferred game), compared to children in the Budgeting-Self condition, as there was no

difference in the average number of tokens allocated across these two conditions. As shown in Figure 2, the distribution of number of tokens allocated per budgeting condition is nearly identical, which means that children in these two groups are benefiting equally; thus, the data did not find a benefit of psychological distance.

I did find support for my hypothesis that children who were planners were more likely to be savers (i.e., those who allocated at least one token for their preferred game also saved at least one token for their preferred game). Specifically, as planner status increased from non-planner to planner, saver status also increased from non-saver to saver. This result is consistent with Kamawar et al.'s (2018) study. It is however, important to note that only 5 children were non-planners and 7 were non-savers across both budgeting conditions. Further, only 3 children were both a non-planner and a non-saver, and only 2 children were both a non-planner and a saver. Given the limited number of non-savers and non-planners, it is difficult to accurately interpret these results.

As argued above in relation to budgeting, it is not clear what the ideal number of tokens is that a child should save for their preferred game. For example, should someone who saves at least one token (out of five) for their preferred game be classified as a saver (as I have done in this study, and was done in Kamawar et al., 2018), or should it be someone who saves the majority of the tokens (i.e., 3 or more out of five) for their preferred game? Given this alternative consideration, the same technique applied to planner status (above) was applied to saver status. Further, I examined performance after first classifying children who saved three or more tokens as savers and others as non-savers. This change increased the total number of non-savers to 14 (8 in Budgeting-Self, and 6 in Budgeting-Other). However, there was one cell with count less than five therefore, the Chi-square test was not robust enough given the distribution of

the data. As an alternative approach, a logistic regression was run using the more stringent values (for both planner and saver status). The statistical significance of an individual regression (i.e., β) was tested using the Wald Chi-square statistic. Results indicated that planner status was still a significant predictor of saver status, χ^2 (1, N =51) = 7.59 p =.006, meaning that planners were more often savers. Additional data is being collected for this study to reach a planned sample size of 108 participants, which should help to clarify the relation between planning to save, and successful saving, in preschoolers. Moreover, if larger studies in the future support these findings, this could be a valuable implication for saving behaviour. For example, giving children the opportunity to create specific, tangible savings plans (i.e., budget) for either themselves or others could increase their saving behaviour.

Results did not support my hypothesis that children who scored higher on the Truck Loading task (measuring general planning) would save more tokens for their preferred game in the savings task. After controlling for both age and general language ability, results indicated that there was a marginal correlation between scores on the Truck Loading task and number of tokens saved across all conditions (p = .055, two-tailed). Although this result was not significant, it was trending in the right direction with children who scored higher on the general planning task tending to save more tokens. However, within the budgeting conditions (examined one a time) there were no significant partial correlations, which was inconsistent with Kamawar et al.'s (2018) study which found that performance on the Truck Loading task was significantly correlated with the number of marbles saved for the preferred game in the budgeting condition (r = .53, p = .019). It is worth noting that Kamawar et al. (2018) had a very similar sample size.

Again, it is important to note that these tasks were different, with the current study examining children's ability to save tokens versus the actual resource (i.e., marbles). It is also

important to note that in the present study, although there was not a ceiling effect, children were scoring fairly high on the truck loading task overall, *M*= 3.0 (out of 4), *SD*= 1.2. It is possible that the small number of non-planners in this sample is due to the children being more skilled in planning, hence their high scores on the Truck Loading task. However, it is also possible that the Truck Loading task was not a sensitive enough measure of planning ability, or perhaps that they were engaging in a different kind of planning. Researchers have hypothesized that the development of saving behaviours is related to the child's ability to mentally project themselves into the future and experience events before they occur, known as Mental Time Travel (Metcalf and Atance (2011). Accordingly, a planning task that relates more to Mental Time Travel may be more appropriate in this saving context, as they had to plan ahead for a future event and imagine themselves playing the second game.

The main planning tasks used with preschoolers are: Tower tasks in which they have to solve a specific problem, by reaching the goal state using the least number of moves and without making any illegal moves (McCormack & Atance, 2011); route planning tasks in which they are asked to plan the most efficient route through a grocery store (e.g., Gauvain & Rogoff, 1989) or through a maze (e.g., Gardner & Rogoff, 1990); and real-world tasks in which they are asked to provide plans for going places such as the beach or grocery shopping (e.g., Hudson et al., 1995) Examining a wider variety of planning tasks than did the current study may yield different patterns of results. For example, real-world tasks may relate more to saving behavior, because they examine preschoolers' ability to create plans for future events and to consider their future self, engaging in these future events (e.g., considering "what will happen"). Thus, children are engaging in mental time travel and imagining themselves in a future state, which could be what

they are doing when deciding when to spend or save their tokens during the savings task. This idea is worth exploring in more depth in future research.

In White and Carlson's (2016) study, children with more mature ToM skills performed significantly better in the self-distancing condition, compared to children with less mature ToM skills. Based on this finding, it was expected that children with more sophisticated ToM skills would be better able to take on the perspective and reason for another person, by engaging in role play, thus performing better on the saving task. However, I did not find support for my exploratory hypothesis that children within the Budgeting-Other condition who scored higher on the Theory of Mind scale would benefit more from psychological distance and thus save more tokens for their preferred game. There was no correlation between theory of mind scores and number of tokens saved after controlling for both age and language ability. Although results from the current study are inconsistent with White and Carlson's (2016) findings, larger studies are needed to explore the possible interaction between ToM, Psychological distance and saving behaviour in young children. In addition to there not being significant correlations between ToM and saving within conditions, there was no significant difference between the partial correlations of each budgeting condition.

This finding is somewhat in contrast to Metcalf and Atance's (2011) study which found that performance on one of their false belief tasks (unexpected contents) was marginally related to the number of marbles saved in the second trial of their marble savings task. It is worth noting that their result was a one-tailed marginal significance, which was not a very certain finding. The current study, employed a different measure of Theory of Mind, one which included a range of types of Theory of Mind understanding. Thus, the relation between ToM and saving still remains unclear.

In summary, the current study suggests that children have the ability to both budget and save a more abstract resource (i.e., tokens) for future use. Results were inconsistent with Kamawar et al.'s (2018) study in regard to performance in the Budgeting-Self condition being greater than Baseline, however in line with their study, more children were savers (saved at least one token) in the budgeting conditions compared to Baseline and children who were planners (budgeted at least one token for their preferred game) were more likely to be savers. Thus, children demonstrate success with this new version of a token-based savings task. In addition, this study provides the novel finding that budgeting for another person results in greater saving compared to not budgeting at all. Results from the current study do not support the idea that planning and ToM are predictive of saving performance. Given the lack of correlation between these measures, it is possible that another variable, above and beyond these skills, is accounting for the variability in performance on the savings task.

Limitations

One notable limitation of the current study, in addition to the ones mentioned above, is that the sample size was smaller than planned. Due to this study being a between-subjects design with children randomly assigned to one of three conditions, it was calculated that there must be a minimum of 36 children per condition to produce a sufficiently powered sample (with a medium effect size). Unfortunately, this study was underpowered, with there being fewer than 36 participants in each condition. While a great deal of effort was put into data collection for this study, too few participants were recruited due to the demands of recruiting at multiple daycare centers around the city. In addition, each child completed two 20-minute sessions, therefore around 40 minutes was spent with each participant, which was time consuming in and of itself. As a result, this study may have failed to detect significant differences.

While it is important to note that significant between-condition differences were found in performance, this study should be expanded to see whether these findings are consistent with a greater number of participants. My lab mates and I will continue to recruit more participants for this study and therefore will be able to investigate the hypotheses in more depth. The full sample of 108 is expected to be collected by early February.

Future Research

The present study provides some insight into preschoolers' ability to save a limited resource. However, there are additional aspects of children's saving ability that warrant investigation. While this study examined the influence of psychological distance on children's saving performance, and found that children saved more when budgeting for another person, compared to Baseline, there was not a significant difference in performance between those who budgeted for themselves versus for another. Therefore, there is no current evidence that self-distancing improves saving behaviour in young children. In future studies, a variety of self-distancing strategies should be compared such as role playing for an exemplar other (i.e., an admirable fictional character as in White & Carlson, 2016), and using third-person speech (i.e., talk through the task using their own name; White & Carlson, 2016), to determine whether some strategies are more effective than others. As previously mentioned, children may benefit more from psychological distance if they are given more opportunity to engage in role-play before completing the saving task. For example, if the child got more into character through dress up, pretend play and answering questions as the character they are pretending to be, they may be better able to take on the perspective of that person and thus make wiser decisions for them. In addition, if they are asked to take on the role of a more well-known and admirable fictional character or hero, they may be motivated and inclined to save more.

In the current study, children had to consider their future selves (or another person's future self) when allocating their tokens for each game. They had to think about what would be more beneficial to them (or another) and then plan accordingly. However, because each child only received a single trial of the savings task, there was no way to determine whether they had learned from experience. If children were given a second trial of the savings task, as done in Metcalf and Atance (2011) and Kamawar et al. (2018), this could have been assessed. Children's ability to learn from the past (i.e., from being disappointed or bored), could change the way they plan to save, in a way that benefits their future selves. Moreover, it is possible that they would have saved a greater average number of tokens in trial 2 versus trial 1 (as seen in Metcalf & Atance, 2011 and Kamawar et al., 2018).

Future research could also incorporate questions asking the children how they or Sam would feel if they did not have any tokens left to play the second game. Similar to being given a prompt to either save or spend their limited resources (as in Dueck's et al., 2018 study), perhaps if children were given a prompt to *pre-experience* the task, and think about how they would feel if they were left with none or few tokens to spend on the second game, it would benefit their saving behaviour. In the context of psychological distance, if children who were given the opportunity to imagine how another child would feel, performed better on the saving task, compared to those who considered their own future self, this could provide insight into the relation between pre-experiencing, self-distancing, and saving behaviour. Further, if future research were to show that children's saving behaviour benefits from pre-experiencing events, this could be a valuable finding for parents and educators. For example, parents could ask their children, to think about how they (or another child) would feel if they had eaten all their candy

the same day, and did not have any left the next day. Once children consider how they will feel the next day, they may choose to save some candy after all.

As previously mentioned, it is hypothesized that Mental Time Travel plays a role in children's saving behaviour, however the relation between Saving and Mental Time Travel is unclear. Future research should incorporate a Mental Time Travel task to measure this cognitive aspect in preschoolers and investigate how it relates to their ability to create a savings plan. For example, children could be asked to complete a task similar to the one conducted by Suddendorf and Busby (2005). In their study, children in the experimental condition were given a puzzle board with no puzzle pieces in one room and after a few minutes, they visited another room where they were told that they would be returning to the first room. They were presented a choice of items to pick from, which included puzzle pieces. Results showed that children chose the puzzle pieces significantly more often in the experimental group (compared to those in the baseline condition who were not given a puzzle board), suggesting that they learned from past experience. It is possible that they may have imagined themselves back in the empty room with only a puzzle board and no pieces to build it and consequently, adjusted their behaviour in anticipation of what they would need to address the problem in the near future. This may relate to the same thought process children are experiencing when engaged in the saving task (i.e., how they should allocate their tokens), particularly if they were to be given two trials of this task.

Lastly, a longitudinal study would be very beneficial to our understanding of the lasting effects of budgeting on saving behaviour (e.g., a few months later). For example, if a child was tested again a few months after completing a budgeting condition of the savings task, this would help determine whether they had learned from past experience, and remembered to use the same budgeting strategies. Further, examining the same group of participants at different ages in

childhood, and again in adulthood would give insight into the benefits of these budgeting strategies relative to their future financial success. For example, if children were tested at age 4 and then again at age 8, changes in saving behavior could be observed, as well as their ability to use budgeting techniques that they learned at a young age.

Conclusion

Overall, the present study makes a novel contribution to the research literature surrounding children's saving behaviour by examining preschoolers' ability to create and implement a budget for both oneself and another. This study also suggests that children are capable of both budgeting and saving an abstract representation of a limited resource, that is similar to money. In other words, they are able to budget and save tokens to buy their preferred prize, rather than saving the resource itself (as in the marble savings tasks). This study lends support for Metcalf and Atance's (2011) finding that children in the preschool years are able to demonstrate saving behaviours, while also lending partial support for Kamawar et al.'s (2018), finding that being given an opportunity to budget benefits children's saving performance. However, in the present study, it was not budgeting for oneself, but rather for another that led to an increase in saving performance, while budgeting for oneself was not significantly different from Baseline, nor was it different from Budgeting-Other.

Given the importance of saving in our everyday lives, this study has implications for educating parents and teachers on how to improve children's saving behaviour, especially when this valuable skill is developing during the preschool years. For example, these findings can be used to inform parents that children can benefit from being given an allowance and the opportunity to formulate an explicit budget, prior to spending it. For example, children could think about someone else, who is just like them, and then allocate their allowance as that other

person should do it, both for immediately available, though less desirable, items and later available more-desirable future items. This idea could apply to different types of resources as well, such as money, treats, stickers or toys, that children could allocate, for a similar other, into different baskets to be used at different periods of time, rather than all at once. For example, children could separate their candy into two baskets, and have the candy from one basket that week, while saving the other for the following week. Thus, the main implication from my study is that providing children opportunities to budget, in a home or school environment, from a young age, may set them on the path of future financial success.

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Appendix A

Carleton UNIVERSITY
Canada's Capital University

Children's Representational Development Lab
www.carleton.ca/crdl

Spring/Summer 2019

Dear Program Coordinator,

As part of a new project on children's cognitive development, we are talking to children to learn more about their developing ability to plan and save for the future. In this letter, we will describe the project and request your permission for your centre's participation.

Should you wish to participate in the current project, we will provide you with individual informed consent letters to distribute to the parent(s) or guardian(s) of the four- and five-year-old children in your centre. Once consent letters have been returned to you from parents/guardians, we will arrange a convenient time for you to have our researchers at your centre to conduct the study. The researchers are university students with current police record checks and copies of these documents will be provided to the daycare director before we commence any interviews with the participating children. The researchers will also be sensitive to the children at all times.

Children will play two games in which they can 'spend' or 'save' tokens (to 'buy' stickers or small toys). Some children will first get the chance to create a plan for their spending to see if that helps them save more. Children will also play games that measure their ability to plan (general planning ability), their ability to reason about their own and others' beliefs (Theory of Mind), and their general language ability. Children usually enjoy these kinds of activities and will be given stickers as thanks (even if they stop playing part-way through). They will get to keep the little stickers and toys, but they will be placed in opaque envelopes and given to their classroom teacher to go home with them. We will also provide enough stickers for all children in the participating classroom to the daycare, so that all children will receive some, regardless of their participation in the study.

We will meet with each child twice, for about 15-20 minutes each session. Participation in this study is completely *voluntary*. Children will be asked if they want to participate, and if they don't, they will not be pressured into participating. Children can stop playing at any time during the session and will still receive their stickers.

The information collected in this study is confidential and will be coded such that a child's name is not associated with their responses. The information provided will be used for research purposes only, and will only be accessible to the researchers directly involved in the project. The consent form will be kept separate from the data in a locked cabinet and will be destroyed after 2 years. The datafile and hard-copies of data, though they do not include identifying information, are stored on a password protected computer (the datafile) and in a locked room (the hard

copies). As soon as we have finished talking with all of the children that will be participating in the study, we will remove the file linking the children's names to their identification numbers used in the datafile. In other words, it will no longer be possible to identify an individual child's responses (the data will be anonymized). As a result, participants will no longer be able to withdraw their data. We estimate that this will occur in the spring of 2020. Analyses presented in presentations or written publications will only contain group data, with no identification of individuals who participated in this study.

The research supervisor of this project is Dr. Deepthi Kamawar and she may be reached at 613-520-2600, ext. 7021 or deepthi.kamawar@carleton.ca**.** The primary researcher involved in this project is Emily Jerome. She can be reached by email at emilyjerome@cmail.carleton.ca.

This study has been cleared by Carleton University Research Ethics Board-B (CUREB-B Clearance#110460) and has been deemed minimal risk. Some participants may find a particular task taxing, which could cause them to become upset. In those rare cases, children are dealt with in a very sensitive manner (told that we're all done, thanked for doing a great job) and taken back to their teachers. We have used similar tasks with children in the same age ranges over the past 15 years and found this reaction to be extremely rare. Should you have any ethical concerns with the study, please contact Dr. Bernadette Campbell, Chair, Carleton University Research Ethics Board-B (by phone: 613-520-2600 ext. 4085 or by email: ethics@carleton.ca). For all other questions about the study, please contact the researcher.

Your consent is required for your centre's participation in this project. Kindly sign the attached consent form indicating whether we may provide you with individual consent forms for parents or guardians of children within this age range in your centre. If you would like a summary of the research results once the study is completed, please contact Deepthi Kamawar. However, please note that individual feedback regarding the children cannot be provided.

Thank you for your consideration.

Sincerely,

Deepthi Kamawar, PhD
Associate Professor
Psychology/Cognitive Science

Emily Jerome
Masters Student
Psychology

Vivian Rigg
Honours Student
Psychology

Brittany Gatzos
Honours Student

Carleton University Study – Preschoolers' Saving Ability
The information collected for this project is confidential and protected under the Provincial Freedom of Information and Protection of Privacy Act.

I have read the attached description of the study 'Preschoolers' Saving Ability' and I understand the conditions of my child care center's participation.

I understand that the study will require two 15- to 20-minute testing sessions, with children of appropriate ages, whose parents/guardians have given written consent for their children's participation in the research project.

Name of Centre: _____
Address: _____
_____
Signature: _____ Date: _____
Name & Title: _____

Appendix B

Carleton UNIVERSITY
Canada's Capital University

Children's Representational Development Lab
www.carleton.ca/crdl

Spring/Summer 2019

Dear parent(s) or guardian(s),

As part of a current project on children's cognitive development, we are talking to children to learn more about their developing ability to save for the future. In this letter, we will describe the project and request your permission for your child to participate. The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your child's involvement.

Children will talk to a researcher, one at a time, and will play two games in which they can 'save' or 'spend' tokens to buy little prizes (e.g., stickers and toys). Children will also play games that measure their ability to plan using a task in which they pretend to be letter carriers and load up a delivery truck, their ability to reason about their own and others' beliefs by hearing stories about characters with different beliefs and predict what the characters might do (e.g., where they'd look for lost mittens), and their general language ability (e.g., point to a picture that matches a word, such as 'dog'). Children usually enjoy these kinds of activities and will be given stickers as thanks (even if they stop playing part-way through). They will get to keep the little stickers and toys, but they will be placed in opaque envelopes and given to their classroom teacher to go home with them. We will also provide enough stickers for all children in the participating classroom to the daycare, so that all children will receive some, regardless of their participation in the study.

We also examined two cognitive factors which might be related: general planning ability and thinking about beliefs (own and others'). General planning ability was measured by a task in which children took on the role of a mail carrier and were asked to plan their route in advance so that they could load up a delivery truck in the most efficient manner. Children also heard stories about two characters who had different beliefs and were asked to predict what the characters might do (e.g., where they'd look for lost mittens). Your child's responses to these questions will help us learn more about how certain skills relate to children's saving behaviour.

The information collected in this study is confidential and will be coded using participant ID numbers, such that a child's name is not associated with their responses. The information provided will be used for research purposes only, and will only be accessible to the researchers directly involved in the project. The consent forms and the file linking participant IDs to participant names will be kept separate from the data in a locked cabinet and will be destroyed after 2 years. The datafile and hard-copies of data, though they do not include identifying information, are stored on a password protected computer (the datafile) and in a locked room (the

hard copies). As soon as we have finished talking with all of the children that will be participating in the study, we will remove the file linking the children's names to their identification numbers used in the datafile. As a result, participants will no longer be able to withdraw their data. We estimate that this will occur by Spring 2020. If you wish to have your child's data withdrawn, please contact Dr. Deepthi Kamawar (deepthi_kamawar@carleton.ca). Analyses presented in presentations, written publications, considered in future research, or discussed in class will only contain group data, with no identification of individuals who participated in this study.

The research supervisor of this project is Dr. Deepthi Kamawar and she may be reached at 613-520-2600, ext. 7021 or deepthi_kamawar@carleton.ca. The primary researcher involved in this project is Emily Jerome. She can be reached by email at emilyjerome@cmail.carleton.ca.

This study has been cleared by Carleton University Research Ethics Board-B (CUREB-B Clearance #110460) and has been deemed minimal risk. Some participants may find a particular task taxing, which could cause them to become upset. In those rare cases, children are dealt with in a very sensitive manner (told that we're all done, thanked for doing a great job) and taken back to their teachers. We have used similar tasks with children in the same age ranges over the past 15 years and found this reaction to be extremely rare. Should you have any ethical concerns with the study, please contact Dr. Bernadette Campbell, Chair, Carleton University Research Ethics Board-B (by phone: 613-520-2600 ext. 4085 or by email: ethics@carleton.ca). For all other questions about the study, please contact the researcher.

Your consent is required for your child's participation in this project. Kindly sign the attached consent form indicating whether your child may participate in this research and return it to your child's daycare. If you would like a summary of the research results once the study is completed, please contact Deepthi Kamawar. However, please note that individual feedback regarding the children cannot be provided.

Thank you for your consideration.

Sincerely,

Deepthi Kamawar, PhD
Associate Professor
Psychology/Cognitive Science

Emily Jerome
Masters Student
Psychology

Vivian Rigg
Honours Student
Psychology

Brittany Gatzos
Honours Student
Psychology

Carleton University Study – Preschoolers' Saving Ability

The information collected for this project is confidential and protected under the Provincial Freedom of Information and Protection of Privacy Act.

I have read and understood the request for my child to participate in the study of '*Preschoolers' Saving Ability'* I have discussed it with my child and ...

☐ I consent to my child's participation in the current study **[please fill out the next page]**

☐ I do not consent to my child's participation in the current study

Child's Name (please print): _____

Parent's/Guardian's Name (please print): _____

Signature: _____ Date: _____

Participant Information
Carleton University Study – Preschoolers' Saving Ability

If you have consented to your child participating on the previous page, please provide us with the following information about your child. If you have not provided consent, please do not fill out this page.

Please note: your child's name and birth date will be kept separate from their data and consent form, and only researchers directly involved in this project will have access to this information.

Child's Date of Birth: year _____ month _____ day _____

Child's gender: _____

Please indicate the language(s) spoken at home and then please circle the ones that your child is fluent in: _____ _____ _____

Appendix C

Token Savings Paradigm Protocol - <u>Common Introduction</u>

I'm going to show you two games today. ***One game is on the green tray*** [point to green tray] ***and one game is on the blue*** **tray** [point to blue tray].

Materials

- ***I have some different prizes for these games*** [There should be 12 toys and 12 stickers laid out in front of the participant]

Do you know what these are called**?** [Point to the stickers]

-
    - *If "stickers*"* → ***That's right, these are stickers.***
    - *If other response → ***Actually, these are stickers.***

- ***Do you know what these are?*** [Point to the toys]
    - *If "toys*"* →***That's right, these are toys.***
    - *If other response → ***Actually, these are toys.***

- ***So, there are two games: the stickers game and the toys game.***

Tokens

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

Preferences

Ask child to pick the 5 stickers and the 5 toys they like best from the piles in front of them.

- ***Let's take a look at these stickers.*** [point]
- ***We need 6 stickers for the stickers game.***
- ***Your job is to pick the 5 stickers you like best and put them in here*** [Point to green bowl and count stickers as child puts them in.]
- ***Now I will pick one!*** [Pick a sticker and put it in the green bowl. Make sure to track which sticker you placed in the bowl.]

- ***Great! Now, let's take a look at these toys.*** [point]
- ***We need 6 toys for the toys game.***
- ***Your job is to pick the 5 toys you like best and put them in here*** [Point to blue bowl and count toys as child puts them in.]
- ***Now I will pick one!*** [pick a toy and put it in the blue bowl. Make sure to track which toy you placed in the bowl.]

Explanations:

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

<u>How to play the **stickers** game:</u>

- ***This is the stickers game. It is on the green tray***. [Point to green tray]

- ***In this game, one token gets you one prize.***
- ***Let me show you how it works.***
- ***If I want a sticker, I have to put one token into this green box.*** [Put token in green box]
- ***Now I can have one sticker. I'm going to take the one I picked!*** [take the sticker you picked out of the bowl]
- ***Remember, the rule is, once you put a token in the green box you can't take it out because it is all used up.***
- ***Now, my sticker goes in here*** [put sticker into white box, point to it]. ***My sticker has to stay in here.***
- ***This one*** [point to child's box] ***is for your prizes. When you get prizes, they have to stay in here.*** [Point to beige box]
- ***That is how you play the stickers game.***

How to play the **toys** game:

- ***This is the toys game. It is on the blue tray***. [Point to blue tray]
- ***In this game, one token gets you one prize.***
- ***Let me show you how it works.***
- ***If I want a toy, I have to put one token into this blue box.*** [Put token in blue box]
- ***Now I can have one toy. I'm going to take the one I picked!*** [Take the toys you picked out of the bowl]
- ***Remember, the rule is, once you put a token in the blue box you can't take it out because it is all used up.***
- ***Now, my toy goes in here*** [put toy into white box, point to it]. ***My toy has to stay in here.***
- ***This one*** [point to child's box] ***is for your prizes. When you get prizes, they have to stay in here.*** [Point to beige box]
- ***That is how you play the toys game.***

Preference check

- Ask the child which prize they like more, between their preferred stickers and preferred toys.

Which do you like more?	Stickers Toys
[point to each] ***These or these?***	

Record task order: (circle response)

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

Record task order:	
First stimulus:	Stickers Toys
Second stimulus:	Stickers Toys

Appendix D

Token Savings Paradigm Protocol—<u>Introduction</u> (Toy=preferred prize[3])
Explanations:

- ***Now it is almost your turn.***
- ***First, I will put the stickers game here*** [point] ***for three minutes.***
- ***After that, I will take the stickers game away and put the toys game here*** [point] ***for three minutes.***

Memory check (Circle responses)
Question A

Okay, so which game will I put here first?	Correct	Incorrect	Don't Know	No Answer
*If "stickers/green" → ***That's right, you will get the green tray with the stickers game.*** *If "blue/toys" → ***No, you will get the green tray with the stickers game.*** *If other response → ***You will get the green tray with the stickers game.*** *If incorrect, repeat memory check question				
Okay, so which game will I put here first?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue				

Question B

Okay, so which game will I put here after that?	Correct	Incorrect	Don't Know	No Answer
*If toys/blue → ***That's right, after the stickers game, you will get the blue tray with the toys game.*** *If green/stickers → ***No, after the stickers game, you will get the blue tray with the toys game.*** *If I don't know → ***After the stickers game, you will get the blue tray with the toys game.*** *If incorrect, repeat memory check question				
Okay, so which game will I put here after that?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue.				

Question C

Now, how do you get a sticker in this game?	Correct	Incorrect	Don't Know	No Answer
*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 sticker.*** *If incorrect response → ***No, you put a token in the green box to get a sticker.*** *If other response → ***You put a token in the green box to get a sticker.*** *If incorrect, repeat memory check question				
Now, how do you get a sticker in this game?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue				

Question D

Now, how do you get a toy 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 toy.*** *If incorrect response → ***No, you put a token in the blue box to get a toy.*** *If other response → ***You put a token in the blue box to get a toy.***				

[3] The protocol for the other option (stickers being the most preferred prize) will be the same, except that 'stickers' will be used instead of 'toys' throughout.

*If incorrect, repeat memory check question				
Now, how do you get a toy in this game?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue				

Instructions:

- ***Remember, one token gets you one prize, and once you put a token in the green box you can't take it out.***
- ***I am giving you five tokens to use: one, two, three, four, five.*** [Place tokens on table as you count them out loud, place them equidistant from both games, in a single line with equal spaces between them]
- ***These are all the tokens I have for you today, so once they are all used up you can't get any more prizes.***

Do you get any more tokens after these are all used up?	Correct	Incorrect	Don't Know	No Answer
*If "no" → ***That's right, these are all the tokens you get.*** *If "Yes" → ***No, you do not get any more tokens. These are all the tokens you get.*** *If other response → ***These are all the tokens you get.*** *If incorrect, repeat question				
Do you get any more tokens after these are all used up?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue				

Appendix E

Token Savings Paradigm Protocol-- <u>Baseline Condition</u> (Toy is preferred)
Standardization Guidelines:

- If child tries to take used tokens out of the box say, ***"Remember, we can't use those tokens anymore"***

- If child attempts to interact with experimenter say, ***"I have to do my work over here."***

- If child attempts to take prizes out of the beige box say, ***"Remember – your prizes have to stay in here [point to child's box]."***

Start stickers game:

- ***Now it is time for the stickers game.***
- ***I am going to put the toys game away.*** [Put blue tray with toys out of sight and place the green tray with stickers centered on child's location; this should result in the tokens being centered in front of the tray]
- ***My timer is set for three minutes. That is how long you get with the stickers game.***
- ***I am going to do some work over there.***
- ***Let's start right now.*** [Turn away and pretend to work for three minutes]

Record observations using table on next page

Observations for stickers 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.

If the child uses all their tokens before the end of the first game, give them 5 more tokens and start the second game (do not make them wait).

Time	# Tokens used	Attempts to retrieve token	Verbalizes saving strategy	Tries to take prize 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 stickers game: _____

*If child asks questions about game or rules or breaks rules, provide neutral response and re-direct to task (e.g., ***"now we are playing the stickers game", "you can choose how you use your tokens", "in this game you use one token to get one prize", "remember, the rule is once the token is in the box it is all used up", "we still have some more time to play this game", "remember, the rule is that you only get a prize if you use a token", "you play the stickers game and I am doing some work")***

Memory check: (circle responses)

Okay, we are done with the stickers game, do you remember which game I will put here now?	Correct Answer	Incorrect	Don't Know	No
*If toys/blue → ***That's right, now it's time for the blue tray with the toys game.*** *If stickers/green → ***No, now it's time for the blue tray with the toys game.*** *If I don't know → ***It's time for the blue tray with the toys game.*** *If incorrect, repeat memory check question.				
Okay, do you remember which game I will put here now?	Correct Answer	Incorrect	Don't Know	No
*If incorrect again, correct and continue.				

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

If child has tokens:

- ***Now it is time for the toys game.*** [Put blue tray with toys on the table]
- ***My timer is set for three minutes. That is how long you get with the toys game.***
- ***I am going to do some work over here.***
- ***Let's start right now.*** [Turn away and pretend to work for three minutes]

[Use observation table on next page and end game after child has used all remaining tokens.]

If child does not have any tokens:

Guess what? We're lucky! I found 5 more tokens, so you get to play the toys game!

[Bring out blue tray and give child tokens to play toys game. This allows the child to play the desired game and have fun. No need to record detailed observations of this activity. Only make note of any saving-related statements.]

Observations for toys 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 take prize 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 toys game: _____

*If child asks questions about game or rules or breaks rules, provide neutral response and re-direct to task (e.g., **"*now we are playing the toys game*", *"you can choose how you use your tokens"*,** "*in this game you use one token to get one prize", "remember, the rule is once the token is in the box it is all used up*", *"we still have some more time to play this game"*,

"remember, the rule is that you only get a prize if you use a token", "you play the toys game and I am doing some work")

*At the end of the task, put all 10 prizes (5 toys and 5 stickers) into an envelope and give it to the teacher.

- ***Thank you for playing these games with me. Guess what?! You get to keep all of the prizes! I will put them in an envelope for you and give it to your teacher. She will keep it safe until the end of the day and then you can take it home!***

Appendix F

Token Savings Paradigm Protocol – <u>Budgeting-Self Condition</u> (Toy is preferred)
Standardization Guidelines:

- If child tries to take used tokens out of the box say, ***"Remember, we can't use those tokens anymore"***
- If child attempts to interact with experimenter say, ***"I have to do my work over here."***
- If child attempts to take prizes out of the beige box say, ***"Remember – your prizes have to stay in here [point to child's box]."***

*Place a small rectangular basket in front of each game (colour matched - one blue and one green).
*Will be asking the child to place the tokens they would like to use for each game in the baskets in front of each game.
• ***For this game, we need two baskets.***
• ***This basket is where you put tokens you want to use in the stickers game*** [point to the basket in front of the green tray]
• ***This basket is where you put tokens you want to use in the toys game*** [point to the basket in front of the blue tray]

Memory check: (circle responses)

Which basket is for the tokens for the stickers game? Green Blue Don't know No Answer
*If stickers/green → ***That's right, that basket*** [point] ***is for the stickers game.*** *If toys/blue → ***No, that basket*** [point] ***is for the stickers game.*** *If I don't know → ***That basket*** [point] ***is for the stickers game.*** *If incorrect, repeat memory check question.
Okay, do you remember which basket is for the tokens for stickers game? Green Blue Don't Know No Answer
*If incorrect again, correct and continue.

Which basket is for the tokens for the toys game? Blue Green Don't Know No Answer
*If toys/blue → ***That's right, that basket*** [point] ***is for the toys game.*** *If stickers/green → ***No, that basket*** [point] ***is for the toys game.*** *If I don't know → ***That basket***[point] ***is for the toys game.*** *If incorrect, repeat memory check question.
Okay, do you remember which basket is for the tokens for the toys game? Blue Green Don't Know No Answer
*If incorrect again, correct and continue.

- ***Remember you have these five tokens.*** **[**point to the tokens]

- ***Okay, now you can choose how many of the tokens you want for the stickers game and how many of the tokens you want for the toys game. Here they are.*** [point to tokens, which are placed equidistant from both games, in a single line with equal spaces between them]
- ***You can use these baskets for your tokens.***
- ***Okay, so go ahead, put them in!***

Number of tokens allocated to the stickers game: _____
Number of tokens allocated to the toys game: _____

If child doesn't do anything, say ***You can choose how you use your tokens. Remember, the green basket*** [point to it] ***is for the tokens for the stickers game and the blue basket*** [point to it] ***is for the tokens for the toys game. Go ahead and put them in!***
If child tries to put tokens into boxes instead of baskets, say ***Remember, for this part of the game you put the tokens in the baskets!*** [point to baskets]

• ***Now it is time for the stickers game.***
• ***I am going to put the toys game away.*** [Put away toys game (blue tray) but leave both baskets out on the table in front of the stickers game (green tray) and follow baseline protocol.]
• ***My timer is set for three minutes. That is how long you get with the stickers game.***
• ***I am going to do some work over there.***
• ***Let's start right now.*** [Turn away and pretend to work for three minutes]

Record observations using table on next page.
If the child uses all their tokens before the end of the first game, give them 5 more tokens and start the second game (do not make them wait).

Number of tokens used in the stickers game: _____

Time	#Tokens used	Attempts to retrieve token	Verbalizes saving strategy	Tries to take prize 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					

*If child asks questions about game or rules or breaks rules, provide neutral response and re-direct to task (e.g., ***"now we are playing the stickers game", "you can choose how you use your tokens", "in this game you use one token to get one prize", "remember, the rule is once the token is in the box it is all used up", "we still have some more time to play this game", "remember, the rule is that you only get a prize if you use a token", "you play the stickers game and I am doing some work")***

Memory check: (circle responses)

Okay, we are done with the stickers game, do you remember which game I will put here now?	Correct	Incorrect	Don't Know	No Answer
*If toys/blue → ***That's right, now it's time for the blue tray with the toys game.*** *If stickers/green → ***No, now it's time for the blue tray with the toys game.*** *If I don't know → ***It's time for the blue tray with the toys game.*** *If incorrect, repeat memory check question.				
Okay, do you remember which game I will put here now?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue.				

I am going to put the stickers game away. [Put green tray with stickers out of sight]
If child has tokens:

Now it is time for the toys game. [Put blue tray with toys on the table]
- ***My timer is set for three minutes. That is how long you get with the toys game.***
- ***I am going to do some work over there.***
- ***Let's start right now.*** [Turn away and pretend to work for three minutes]

Use observation table on next page and end game after child has used all remaining tokens.

If child does not have any tokens:

Guess what? We're lucky! I found 5 more tokens, so you get to play the toys game!
[Bring out blue tray and give child tokens to play toys game. This allows the child to play the desired game and have fun. No need to record detailed observations of this activity. Only make note of any saving-related statements.]

Observations for toys 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 take prize 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 toys game: _____
*If child asks questions about game or rules or breaks rules, provide neutral response and re-direct to task (e.g., **"*now we are playing the toys game*", *"you can choose how you use your tokens"*, "*in this game you use one token to get one prize", "remember, the rule is once the token is in the box it is all used up*", *"we still have some more time to play this game"*, *"remember, the rule is that you only get a prize if you use a token", "you play the toys game and I am doing some work*")

*At the end of the task, put all 10 prizes (5 toys and 5 stickers) into an envelope and give it to the teacher.

- ***Thank you for playing these games with me. Guess what?! You get to keep all of the prizes! I will put them in an envelope for you and give it to your teacher. She will keep it safe until the end of the day and then you can take it home!***

Appendix G

Token Savings Paradigm Protocol- <u>Budgeting- Other</u> Condition (Toy is preferred)

Standardization Guidelines:

- If child tries to take used tokens out of the box say, ***"Remember, we can't use those tokens anymore"***
- If child attempts to interact with experimenter say, ***"I have to do my work over here."***
- If child attempts to take prizes out of the beige box say, ***"Remember – your prizes have to stay in here [point to child's box]."***

*Place a small rectangular basket in front of each game (colour matched - one blue and one green).
*Will be asking the child to place the tokens they would like to use for each game in the baskets in front of each game.
• ***For this game, we need two baskets.***
• ***This basket is where you put tokens to use in the stickers game*** [point to the basket in front of the green tray]
• ***This basket is where you put tokens to use in the toys game*** [point to the basket in front of the blue tray]

Memory check: (circle responses)

Which basket is for the tokens for the stickers game? Green Blue Don't know No Answer
*If stickers/green → ***That's right, that basket*** [point] ***is for the stickers game.*** *If toys/blue → ***No, that basket*** [point] ***is for the stickers game.*** *If I don't know → ***That basket [***point] ***is for the stickers game.*** *If incorrect, repeat memory check question.
Okay, do you remember which basket is for the tokens for stickers game? Green Blue Don't Know No Answer
*If incorrect again, correct and continue.

Which basket is for the tokens for the toys game? Blue Green Don't Know No Answer
*If toys/blue → ***That's right, that basket [***point] ***is for the toys game.*** *If stickers/green → ***No, that basket [***point] ***is for the toys game.*** *If I don't know → ***That basket [***point] ***is for the toys game.*** *If incorrect, repeat memory check question.
Okay, do you remember which basket is for the tokens for the toys game? Blue Green Don't Know No Answer
*If incorrect again, correct and continue.

There should be 5 tokens placed equidistant from both games, in a single line with equal spaces between them on the table in between the two trays.

- ***This is Sam*** [point to picture of child]
- ***Sam is very smart!*** **Sam is very good at these kinds of games!**
- ***When I showed Sam the stickers, Sam liked these stickers, just like you!*** [point to stickers]
- ***When I showed Sam the toys, Sam liked these toys, just like you!*** [point to toys]
- ***Sam also liked the toys/stickers more than the stickers/toys, just like you***! [point to toys/stickers]

- Give the child a bracelet[4] to wear and ask them to pretend they are the person in the picture.

- ***See this bracelet? It has Sam's name and photo on it. You get to wear it!*** [Put the bracelet on child]

- ***I want you to pretend that you are Sam now, okay?***
- ***Okay, so who are you pretending to be?*** _____ [write down child's response]
- ***Great! Now you're Sam!***

- ***Remember you have these five tokens.*** **[**point to the tokens]
- ***Now, Sam is just like you and likes the toy/stickers more. And remember, Sam is very smart and good at these kinds of games!***
- ***For these games, you are being Sam and Sam is good at these kinds of games. I want you to ask yourself, "Where should Sam put these tokens?"***
- ***Okay, so go ahead, put them in!***
- ***You can use the tokens in the baskets when you play the games!***

Number of tokens allocated to the stickers game: _____
Number of tokens allocated to the toys game: _____

If child doesn't do anything, say ***You can choose how you use your tokens. Remember, the green basket*** [point to it] ***is for the tokens for the stickers game and the blue basket [*****point to it]*** ***is for the tokens for the toys game. Go ahead and put them in!***
If child tries to put tokens into boxes instead of baskets, say ***Remember, for this part of the game you put the tokens in the baskets!*** [point to baskets]

• Now it is time for the stickers game.
• I am going to put the toys game away. [Put away toys game (blue tray) but leave both small trays out on the table in front of the stickers game (green tray) and follow baseline protocol.]
• My timer is set for three minutes. That is how long you get with the stickers game.
• I am going to do some work over there.
• Let's start right now. [Turn away and pretend to work for three minutes]

Record observations using table on next page

[4] Bracelet has the name 'Sam' on it and a picture of Sam.

Observations for stickers 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.

If the child uses all their tokens before the end of the first game, give them 5 more tokens and start the second game (do not make them wait).

Number of tokens used in the stickers game: _____

Time	#Tokens used	Attempts to retrieve token	Verbalizes saving strategy	Tries to take prize 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					

*If child asks questions about game or rules or breaks rules, provide neutral response and re-direct to task (e.g. ***"now we are playing the stickers game", "you can choose how you use your tokens", "in this game you use one token to get one prize", "remember, the rule is once the token is in the box it is all used up", "we still have some more time to play this game", "remember, the rule is that you only get a prize if you use a token", "you play the stickers game and I am doing some work")***

Memory check: (circle responses)

Okay, we are done with the stickers game, do you remember which game I will put here now?	Correct	Incorrect	Don't Know	No Answer
*If toys/blue → ***That's right, now it's time for the blue tray with the toys game.*** *If stickers/green → ***No, now it's time for the blue tray with the toys game.*** *If I don't know → ***It's time for the blue tray with the toys game.*** *If incorrect, repeat memory check question.				
Okay, do you remember which game I will put here now?	Correct	Incorrect	Don't Know	No Answer
*If incorrect again, correct and continue.				

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

If child has tokens:

- ***Now it is time for the toys game.*** [Put blue tray with toys on the table]
- ***My timer is set for three minutes. That is how long you get with the toys game.***
- ***I am going to do some work over here.***
- ***Let's start right now.*** [Turn away and pretend to work for three minutes]

Use observation table on next page and end game after child has used all remaining tokens.

If child does not have any tokens:

Guess what? We're lucky! I found 5 more tokens, so you get to play the toys game!

[Bring out blue tray and give child tokens to play toys game. This allows the child to play the desired game and have fun. No need to record detailed observations of this activity. Only make note of any saving-related statements.]

Observations for toys 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 take prize 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 toys game: _____

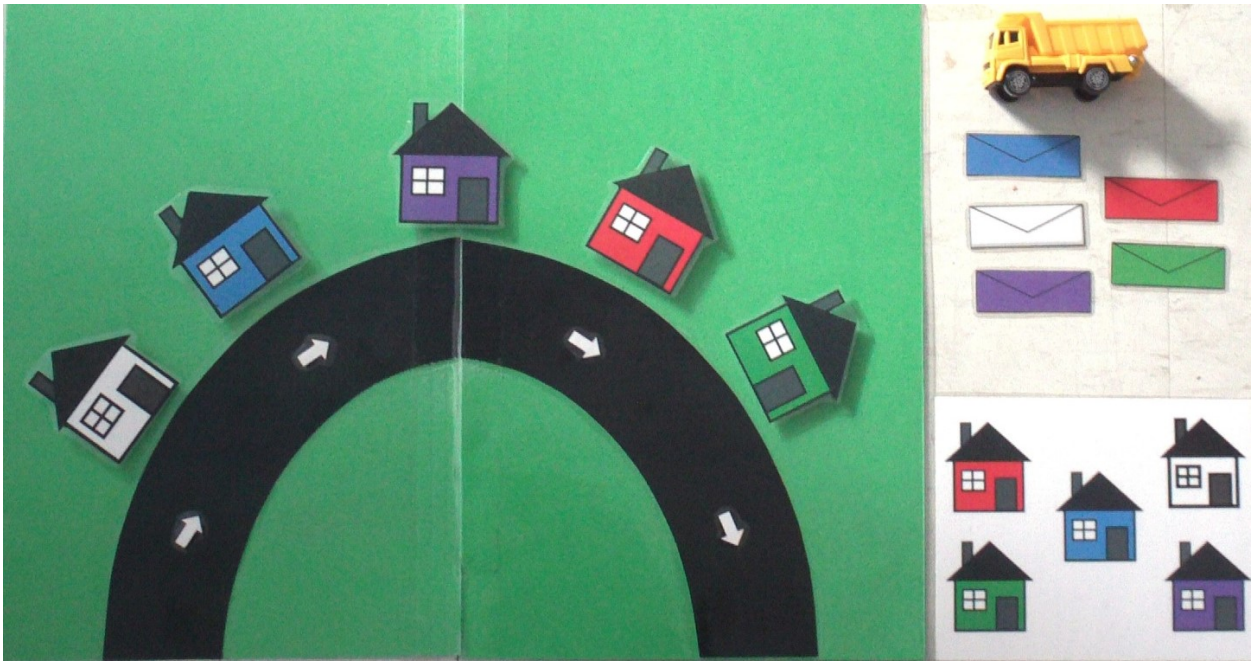
*If child asks questions about game or rules or breaks rules, provide neutral response and re-direct to task (e.g., **"*now we are playing the toys game*", *"you can choose how you use your tokens*", "*in this game you use one token to get one prize", "remember, the rule is once the token is in the box it is all used up*", *"we still have some more time to play this game"*, *"remember, the rule is that you only get a prize if you use a token", "you play the toys game and I am doing some work*")

*At the end of the task, put all 10 prizes (5 toys and 5 stickers) into an envelope and give it to the teacher.

- ***Thank you for playing these games with me. Guess what?! You get to keep all of the prizes! I will put them in an envelope for you and give it to your teacher. She will keep it safe until the end of the day and then you can take it home!***

Appendix H

Truck Loading Task



Truck Loading Task protocol:

Colour check: *(place sheet with colours on table)*
Can you show me Purple? Yellow? Green? Blue? Red? *(randomize)*
Record accuracy:
Purple____ Yellow____ Green____ Blue____ Red____

(*start with yellow house and envelope*)

O.K. Now we're going to play a new game. Let's pretend that you're a mail carrier. We're going to have a party and I need you to deliver this party invitation to this house *(point)*

See, the yellow invitation goes to the yellow house. First, we need to load the truck *(let child place yellow invitation in back of truck*)

Direction Rule
Now this is a one-way street which means that you can only drive this way with the truck *(point with finger).* **You have to follow the arrows**. **Why don't you deliver the yellow invitation to the yellow house?** *(place truck at start, and have child drive the truck all the way around the road, back to the start).*

If incorrect: **O.K. remember this is a one-way street, so you need to drive around like this** (*demo*). **Why don't you try again?**

Total # of tries until correct (max 3, then continue): _____

O.K.! (*take back yellow invitation*)

Order Rule

(add purple house) **Now there are two houses that we want to invite to the party. The yellow invitation goes to the yellow house and the purple invitation goes to the purple house** *(point)*

Now, we need to deliver these party invitations fast so that everyone will be able to come to the party. The fastest way is to drive around the block only one time.

We need to put the invitations in the back of the truck so that the top invitation goes to the house that you are driving by. You always have to take the invitation off the top of the truck so that the top invitation goes to the first house and the next invitation goes to the next house.

So now we need to load the truck. Let's see here, it looks like the first house you will drive by is the yellow house, so the yellow invitation has to go on the very top.

And the second house you will drive by is the purple house, so the purple invitation needs to go on the bottom.

So first let's put in the purple invitation and then put in the yellow invitation.
(*Pile the 2 invitations in truck, one at a time.*)
Now, remember, we can only take an invitation from the top of the truck. We can never take an invitation from the bottom of the truck. So, can I take one from the bottom like this? (*demo*)

No way!
If yes, repeat until says no (max 3 times, then continue)

Total # of tries until correct: _____

Now let's deliver the invitations. Why don't you drive? (*try and have C deliver the invitations, but help if needed)* **See, now as I drive by, I can first deliver the yellow invitation to the yellow house and then next I can deliver the purple invitation to the purple house. Yeah, now everyone can come to the party!**

LEVEL 1: 2 houses

(*Place red then green).* **Here's a red invitation for the red house and a green invitation for the green house (***point*).

Now it's your turn to deliver the party invitations to all of the houses on the block so that everyone can come to the party. O.K., remember the rules, each colour invitation goes to the same colour house, and you need to follow the arrows around the block because this is a one-way street. And when delivering the invitations, you can only take the top invitation; you can never take one from the bottom.

Here are the invitations. *(Place down, red slightly to C's left and green slightly to right)*

O.K., now it's your turn to load the truck.

____ ____ CORRECT
Good job! Let's add another house.

INCORRECT *(remind of rule broken and circle)*
____ ____ [colour rule] **Whoops! Remember each colour invitation goes to each colour house**
____ ____ [direction rule] **Whoops! Remember this is a one-street, so you have to follow the arrows. You can only drive in one direction, no backing up.**
____ ____ [order rule] **Whoops! Remember you can only take an invitation from the top of the truck. You can never take an invitation from the bottom of the truck.**
____ ____ [tries to drive around block another time] **Whoops! We ran out of time. It's time for the party to start. Remember you can only drive around the block once.**

TRIAL 1: PASS (go to next level) FAIL (repeat; **This one is a hard one. Let's try again**).

TRIAL 2: PASS (go to next level) FAIL (stop)

<u>LEVEL 2: 3 houses</u>

Now let's pretend that there are 3 houses on the block and you want to invite all 3 houses to the party (*place blue, yellow, green).* **Here's a blue invitation for the blue house. Here's a yellow invitation for the yellow house. And here's a green invitation for the green house** (*point*).

Here are the invitations (*place down, green slightly to C's left*, *blue in front, and yellow slightly to right*)
Go ahead and load up the truck.

____ ____ CORRECT
Good job! Let's add another house.

INCORRECT *(remind of rule broken and circle)*
____ ____ [colour rule] **Whoops! Remember each colour invitation goes to each colour house**
____ ____ [direction rule] **Whoops! Remember this is a one-street, so you have to follow the arrows. You can only drive in one direction, no backing up.**

____ ____ [order rule] **Whoops! Remember you can only take an invitation from the top of the truck. You can never take an invitation from the bottom of the truck.**
____ ____ [tries to drive around block another time] **Whoops! We ran out of time. It's time for the party to start. Remember you can only drive around the block once.**

TRIAL 1: PASS (go to next level) FAIL (repeat; **This one is a hard one. Let's try again**).

TRIAL 2: PASS (go to next level) FAIL (stop)

Level 3: 4 houses

Now let's pretend that there are 4 houses on the block and you want to invite all 4 houses to the party (*place purple, green, blue, yellow)* **Here's a purple invitation for the purple house,….etc** *(point).*

Here are the invitations. *(place down centered from left to right: green, blue, purple, yellow)*

Go ahead and load up the truck.

____ ____ CORRECT
Good job! Let's add another house.

INCORRECT *(remind of rule broken and circle)*
____ ____ [colour rule] **Whoops! Remember each colour invitation goes to each colour house**
____ ____ [direction rule] **Whoops! Remember this is a one-street, so you have to follow the arrows. You can only drive in one direction, no backing up.**
____ ____ [order rule] **Whoops! Remember you can only take an invitation from the top of the truck. You can never take an invitation from the bottom of the truck.**
____ ____ [tries to drive around block another time] **Whoops! We ran out of time. It's time for the party to start. Remember you can only drive around the block once.**
TRIAL 1: PASS (go to next level) FAIL (repeat; **This one is a hard one. Let's try again**).

TRIAL 2: PASS (go to next level) FAIL (stop)

Level 4: 5 houses

Now let's pretend that there are 5 houses on the block and you want to invite all 5 houses to the party. *(place green, yellow, red, purple, blue)*

Here are the invitations. *(place down centered left to right: green, blue, purple, red, yellow)*

Go ahead and load up the truck.

____ ____ CORRECT
Good job!

INCORRECT *(remind of rule broken and circle)*

____ ____ [colour rule] **Whoops! Remember each colour invitation goes to each colour house**

____ ____ [direction rule] **Whoops! Remember this is a one-street, so you have to follow the arrows. You can only drive in one direction, no backing up.**

____ ____ [order rule] **Whoops! Remember you can only take an invitation from the top of the truck. You can never take an invitation from the bottom of the truck.**

____ ____ [tries to drive around block another time] **Whoops! We ran out of time. It's time for the party to start. Remember you can only drive around the block once.**

TRIAL 1: PASS (stop) FAIL (repeat; **This one is a hard one. Let's try again**).

TRIAL 2: PASS (stop) FAIL (stop)

Great job!

TOTAL NUMBER OF TRIALS: _____

HIGHEST LEVEL ACHIEVED: _____

Appendix I
Theory of Mind Scale

Modified from Wellman and Liu (2004)

Diverse desires

E presents child with a toy figure of an adult and a sheet of paper with a carrot and a cookie on it. **"Here's Mr. Jones. It's snack time, so, Mr. Jones wants a snack to eat. Here are two different snacks: a carrot and a cookie. Which snack would you like best? Would you like a carrot or a cookie best?**"

_____ *Carrot* _____ *Cookie*

[If the child chooses the carrot]

"Well, that's a good choice, but Mr. Jones really likes cookies. He doesn't like carrots. What he likes best are cookies."

Target Question: **"So, now it's time to eat. Mr. Jones can only choose one snack, just one. Which snack will Mr. Jones choose? A carrot or a cookie?"**

_____ *Carrot (Incorrect)* _____ *Cookie (Correct)*

[If the child chooses the cookie]

"Well, that's a good choice, but Mr. Jones really likes carrots. He doesn't like cookies. What he likes best are cookies."

Target Question: **"So, now it's time to eat. Mr. Jones can only choose one snack, just one. Which snack will Mr. Jones choose? A carrot or a cookie?"** *The child must answer the target question opposite from his or her answer to the own-desire question.*

_____ *Carrot (Correct)* _____ *Cookie (Incorrect)*

Diverse Beliefs

E presents child with a toy figure of a girl and a sheet of paper with bushes and a garage on it. **"Here's Linda. Linda wants to find her cat. Her cat might be hiding in the bushes or it might be hiding in the garage. Where do you think the cat is? In the bushes or in the garage?"**

_____ *Bushes* _____ *Garage*

[If the child chooses the bushes]

"Well, that's a good idea, but Linda thinks her cat is in the garage. She thinks her cat is in the garage."

Target Question: **"So where will Linda look for her cat? In the bushes or in the garage?"**

_____ *Bushes (Incorrect)* _____ *Garage (Correct)*

[If the child chooses the garage]

"Well, that's a good idea, but Linda thinks her cat is in the bushes. She thinks her cat is in the bushes."

Target Question: **"So where will Linda look for her cat? In the bushes or in the garage?"** *The Child must answer the target question opposite from his or her answer to the own belief question.*

_____ *Bushes (Correct Answer)* _____ *Garage (Incorrect)*

Knowledge Access

*Step 1: E presents child with a nondescript plastic box with a drawer containing a small plastic toy dog inside the closed drawer. "***Here's a drawer. What do you think is inside the drawer?"** *The child can give any answer he or she likes or indicate that he or she does not know.*

Step 2: **"Let's see what's inside!"** *E opens the drawer and the child is shown the content of the drawer. E closes the drawer. "***Okay, what is in the drawer?**"

Answer: _____ *Correct?* _____

Step 3: E present child with a toy figure of a girl.
*Target Question: "***Polly has never ever seen inside this drawer. Now here comes Polly. So, does Polly know what is in the drawer?"**

_____ *Yes (Incorrect)* _____ *No (Correct)*

Memory Question: **"Did Polly see inside this drawer?"**

_____ *Yes (Incorrect)* _____ *No (Correct)*

Must get Target and Memory Question correct to be counted as correct.

Contents False Belief

Step 1: E presents child with a clearly identifiable Band-Aid box with a plastic toy pig inside the closed Band-Aid box. **"Here's a Band-Aid box. What do you think is inside the box?"** *Child gives answer.* child's answer:_____

Step 2: **"Let's see what's inside!"** *E opens the box to reveal the pig. E closes the band-Aid box.* **"Okay, what is in the box?"** *Child gives answer.* child's answer:_____

Step 3: E presents the child with a toy figure of a boy.
Target Question: **"Peter has never ever seen inside this box. Now here comes Peter. So, what does Peter think is in the box? Band-Aids or a pig?"**

_____ *Band-Aids (Correct)* _____ *Pig (Incorrect)*

Memory Question: **"Did Peter see inside this box?"**

_____ *Yes (Incorrect)* _____ *No (Correct)*

Must get Target and Memory Question correct to be counted as correct.

Explicit False Belief

E presents child with a toy figure of a boy and a sheet of paper with a backpack and a closet on it. **"Here's Scott. Scott wants to find his mittens. His mittens might be in his backpack or they might be in the closet. Really, Scott's mittens are in his backpack. But Scott thinks his mittens are in the closet."**

*Target Question: "***So, where will Scott look for his mittens? In his backpack or in the closet?"**

_____ *Backpack (Incorrect)* _____ *Closet (Correct)*

Reality Question: **"Where are Scott's mittens really? In his backpack or in the closet?"**

_____ *Backpack (Correct)* _____ *Closet (Incorrect)*

Must get Target and Reality Question correct to be counted as correct.

Belief–Emotion

Step 1: E presents child with a toy figure of a boy and a clearly identifiable individual-size cereal box with rocks inside the closed box. **"Here is a cereal box and here is Teddy. What do you think is inside the box?"** *(child names cereal or says 'cereal')* child's answer:_____

E makes Teddy speak. Teddy says, **"Oh good, because I love _____ [child's answer]. _____ [child's answer] are my favorite snack. Now I'll go play."** *E puts Teddy away and out of sight.*

Step 2: Next, the cereal box is opened and the contents are shown to the child. **"Let's see what's inside! There's nothing but rocks."** *E closes the cereal box.* **"Okay, what is Teddy's favorite snack?"** *child's answer: _____).*

Then Teddy comes back. Target Question: **"Teddy has never ever seen inside this box. Now here comes Teddy. Teddy's back and it's snack time. Let's give Teddy this box. Before Teddy opens the box, how does Teddy feel when he gets this box? Happy or sad?"**

_____ *Happy (Correct)* _____ *Sad (Incorrect)*

Step 3: E opens the Cheerios box and lets the toy figure look inside.
Emotion-Control Question: **"How does Teddy feel after he looks inside the box? Happy or sad?"**

_____ *Happy (Incorrect)* _____ *Sad (Correct)*

Must get Target Question and Emotion-Control Question correct to be counted as correct.

Real–Apparent Emotion

Step 1: E presents child with a sheet of paper with three faces (happy, just ok and sad). E introduces them to check that the child knows these emotional expressions. Then that paper is put aside, and the task begins with the child being shown a cardboard cutout figure of a boy drawn from the back so that the boy's facial expression cannot be seen. **"This story is about a boy. I'm going to ask you about how the boy really feels inside and how he looks on his face. He might really feel one way inside but look a different way on his face. Or, he might really feel the same way inside as he looks on his face. I want you to tell me how he really feels inside and how he looks on his face. This story is about Matt. For his birthday, Matt had asked for a cool red shirt from his favourite store. On his birthday, Aunt Rosie gives Matt the last gift. When he opens it, he finds an ugly green shirt. All of Matt's family thought it was a great gift, but not Matt. Matt didn't like the gift. Matt didn't want his Aunt Rosie to see how he felt about the gift, because it would make her sad. So Matt tried to hide how he felt."**

Step 2: E gives the child memory check. **"What did Matt want for his birthday?"**
(a red shirt*) Other answer:* _____

"In the story, what would happen if Matt showed his true feelings about the gift?" *E points to the three emotion pictures.*
(He would make his Aunt sad) *Other answer:* _____

The Target-Feel Question: **"So, how did Matt really feel, when he opened the gift? Did he feel happy, sad, or okay?"**
Answer (circle one): happy, sad, or okay

The Target-Look Question: **"How did Matt try to look on his face, when he opened the gift? Did he look happy, sad, or okay?"**
Answer (circle one): happy, sad, or okay

To be correct the child's answer to the target-feel question must be more negative than his or her answer to the target-look question

Appendix J

Carleton UNIVERSITY
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CERTIFICATION OF INSTITUTIONAL ETHICS CLEARANCE

The Carleton University Research Ethics Board-B (CUREB-B) has granted ethics clearance for the research project described below and research may now proceed. CUREB-B is constituted and operates in compliance with the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2).

Ethics Protocol Clearance ID: Project # 110460

Research Team: Emily Jerome (Primary Investigator)
Brittany Gatzos (Co-Investigator)
Vivian Rigg (Other)
Dr. Deepthi Kamawar (Research Supervisor)

Project Title: Preschoolers' Saving Ability

Funding Source (If applicable):

Effective: **March 25, 2019** Expires: **March 31, 2020.**

Please ensure the study clearance number is prominently placed in all recruitment and consent materials: CUREB-B Clearance # 110460.

Restrictions:

This certification is subject to the following conditions:

1. Clearance is granted only for the research and purposes described in the application.
2. Any modification to the approved research must be submitted to CUREB-B via a Change to Protocol Form. All changes must be cleared prior to the continuance of the research.
3. An Annual Status Report for the renewal of ethics clearance must be submitted and cleared by the renewal date listed above. Failure to submit the Annual Status Report will result in the closure of the file.If funding is associated, funds will be frozen.
4. A closure request must be sent to CUREB-B when the research is complete or terminated.
5. During the course of the study, if you encounter an adverse event, material incidental finding, protocol deviation or other unanticipated problem, you must complete and submit a Report of

Adverse Events and Unanticipated Problems Form, found here:
https://carleton.ca/researchethics/forms-and-templates/

Failure to conduct the research in accordance with the principles of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans 2ndedition* and the *Carleton University Policies and Procedures for the Ethical Conduct of Research* may result in the suspension or termination of the research project.

Upon reasonable request, it is the policy of CUREB, for cleared protocols, to release the name of the PI, the title of the project, and the date of clearance and any renewal(s).

Please contact the Research Compliance Coordinators, at ethics@carleton.ca, if you have any questions.

CLEARED BY: **Date: March 25, 2019**

[redacted]

Bernadette Campbell, PhD, Chair, CUREB-B

[redacted]

Natasha Artemeva, PhD, Vice-Chair, CUREB-B