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Across three studies, we examined 4- to 7-year-olds' predictions of goal-directed behaviors when goals conflict with preferences. In Study 1, when presented with stories in which a character had to act against basic preferences to achieve an interpersonal goal (e.g., playing with a partner), 6- and 7-year-olds were more likely than 4- and 5-year-olds to predict the actor would act in accordance with the goal to play with the partner, instead of fulfilling the basic preference of playing a favored activity. Similar results were obtained in Study 2 with scenarios that each involved a single individual pursuing intrapersonal goals that conflicted with his or her basic preferences. In Study 3, younger children's predictions of goal-directed behaviors did not increase for novel goals and preferences, when the influences of their own preferences, future thinking, or a lack of impulse control were minimized. The results suggest that between ages 4 and 7, children increasingly integrate and give more weight to other sources of motivational information (e.g., goals) in addition to preferences when predicting people's behaviors. This increasing awareness may have implications for children's self-regulatory and goal pursuit behaviors.

Keywords: goals, preferences, temptations, goal-directed predictions, self-control

I arise in the morning torn between a desire to improve the world and a desire to enjoy the world. This makes it hard to plan the day.
—E. B. White

As humans, we constantly experience and try to satisfy various desires. Randomly sampling people's experience reveals that people feel some sort of desire about half of their waking time, and about half of those involve conflicts between important goals and basic preferences, such as trying to stay focused on work and feeling the urge to play video games (Hofmann, Baumeister, Förster, & Vohs, 2012). This reality paints a vivid picture of our subjective life: desire is a frequent theme, with internal conflicts between goals and basic preferences being a constant feature. In a general sense, goals and preferences share features as mental constructs, but a goal is more active and prioritized, and may be evaluated by the individual as more important than competing preferences. Without goals, we can easily fall into the swamp of various basic preferences, not knowing how to prioritize our actions or simply acting in a mindless fashion. Goals could stand out like a spotlight, giving us directions for our attention and actions. Therefore, goals have special motivating power and play important roles in what we achieve in life (Elliott & Dweck, 1988).

Humans are sensitive to goals and goal-directed behaviors extremely early in life. Even infants appear to perceive people as self-propelled and goal-directed agents (Premack, 1990). Babies interact differently with people than they do with objects and encode human but not object actions as goal-directed (Poulin-Dubois & Shultz, 1988; Spelke, Phillips, & Woodward, 1995; Woodward, 1998). By age 1, infants could construe sequences of actions as related to an overarching goal (Woodward & Sommerville, 2000). Eye-movement evidence suggests infants not only recognize goal-directed actions, but they also use goal information to predict people's actions (Falck-Ytter, Gredebäck, & von Hofsten, 2006; Krogh-Jespersen & Woodward, 2014). These findings suggest humans have a natural tendency to perceive goals and actions as intertwined; we know that actions are guided by goals, and goals predict actions from the very beginning of life.

In reality, acting according to goals can be challenging, and individuals often have to overcome obstacles to perform goal-directed actions. The hurdles to goal-directed actions could be external, such as unfavorable environmental conditions. But, as suggested by people's daily reports (Hofmann et al., 2012), oftentimes what prevents individuals from acting on goals is not anything external, but their own competing preferences and temptations. As adults, we are familiar with and understand the situations in which a person has to give up her urges (e.g., eating what she likes) for the sake of fulfilling more important goals (e.g., lose weight and be healthy). We know young children are able to engage in similar efforts too, as evidenced by many preschoolers' impressive ability of resisting the temptation to eat one marshmallow immediately to get two marshmallows later (Mischel, Ebbesen, & Raskoff Zeiss, 1972; Mischel, Shoda, & Rodriguez, 1989). The question is, how do young children understand these situations? As reviewed above, even infants understand that a person acts on goals (e.g., Falck-Ytter et al., 2006; Krogh-

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Jespersen & Woodward, 2014; Woodward, 1998; Woodward & Sommerville, 2000), but what if individuals' preferences are in the way of their goal-directed actions? Do children still understand and predict that people will act according to goals in these situations? Or do they expect the person to give in to their preferences?

The literature shows that in addition to goals, preference is also a salient mental construct for young children. Even 18-month-olds ascribe unique preferences to other people (Repacholi & Gopnik, 1997). Children talk about what people like or dislike as young as 2 years (Bartsch & Wellman, 1995) and predict people's actions and emotions based on this (Wellman & Woolley, 1990). By 3 years, children know that other people may prefer something different from themselves and can predict their actions accordingly (Cassidy et al., 2005; Flavell, Flavell, Green, & Moses, 1990; Rakoczy, Warneken, & Tomasello, 2007). By age 5, children are able to identify other people's preferences even when they have strong incompatible preferences or stereotypical beliefs about the desirability of the target (Atance, Bélanger, & Meltzoff, 2010; Moore et al., 1995; Rieffe, Meerum Terwogt, Koops, Stegge, & Oomen, 2001). In fact, young children not only predict that people act to fulfill preferences, they also view preferences as constraints on people's behaviors. Preschoolers are much more likely than kindergarteners to question people's freedom to act against their own desires or preferences (Kushnir, Gopnik, Chernyak, Seiver, and Wellman, 2015). Therefore, it seems young children have a strong tendency to attribute preferences to people and use them to predict people's actions. It is thus an intriguing open question whether children understand the situations in which an individual may need to act against preferences for the sake of an important goal.

There is little work directly examining children's predictions of goal-oriented behaviors when preferences and goals are in conflict. But relevant to this question, researchers have investigated children's predictions of individuals' actions when preferences conflict with external constraints (e.g., rules and norms). There is evidence that preschoolers do not reliably predict people would act according to external rules in these situations (Lagattuta, Nucci, & Bosacki, 2010). For example, Lagattuta and colleagues (2010) found that when a character's preferred action conflicted with parental or moral rules, 4- and 5-year-olds predicted low rates of compliance. Seven-year-olds were more likely to predict that the individual would act against the basic preference to comply with moral rules and would feel good about it. Other studies examining children's reasoning about situations involving conventional (Bernard, Clément, & Kaufmann, 2016) or novel rules (Kalish & Shiverick, 2004, Experiment 2) found that when these rules conflicted with individuals' basic preferences, 4- and 5-year-olds were equally likely to predict the individual would follow rules or fulfill preferences. Therefore, these findings suggest that for preschool children, basic preferences are at least as strong as rules in motivating behaviors.

Other findings seem to suggest a different developmental pattern. Chernyak, Kushnir, Sullivan, and Wang (2013) examined children's beliefs about personal choices in the face of various external constraints. Children were told that some characters always acted in one way (consistent with social, moral, or arbitrary rules) but preferred to act in another way today. When asked about what the person would do, 4- and 5-year-olds predicted rule-based behaviors, while with age children increasingly predicted more

preference-based actions. Information about the individual's past behaviors might account for the differences in the findings between this study and others. In this study, it was emphasized that the individuals always followed the rules in the past, which might serve as strong cues for future actions for young children. The consistent compliance could also suggest that the rules were internalized to some extent and thus were not completely external like those sanctioned by authoritative figures in other studies. Taken together, it seems when preferences conflict with external social and moral constraints, young children tend to regard them as equally strong motivational sources for behaviors, although external constraints may trump preferences when there are cues suggesting that the individuals have consistently complied previously.

Goals and rules are similar in the sense that they both frequently conflict with preferences and have the potential to motivate people to act against their basic preferences and temptations. However, goals and rules are also different in at least one important respect: Goals are inherently internal, whereas rules are usually external. When a person acts according to goals, the person is typically internally motivated, whereas when a person acts according to rules, the person is often externally motivated (unless the rule is internalized, and it would function more like a goal). It is possible that the internal versus external motivation might make a difference in children's predictions of behaviors. Indeed, Lagattuta (2005) found that even within the domain of rules, children responded differently to internally versus externally recalled rules. Children of all ages attributed more positive feelings to characters who adhered to internally recalled rules than to those who complied with externally heard rules.

Therefore, one possibility is that compared to external constraints, being internally motivated, goals may be more likely to trump competing preferences for young children. If that is the case, children might be less likely to predict preference-based actions when there are competing goals than when there are competing rules. Alternatively, it is also possible that young children view basic preferences, rules, and goals all as strong motivational sources, and with age they may increasingly realize other internal and external sources of information may trump personal preferences in some contexts. If that is true, then older children may predict more goal-directed actions than preschoolers do when goals conflict with preferences. Our paper aims to investigate these possibilities regarding children's predictions of goal-directed actions when goals and preferences are in conflict.

Children's beliefs about acting on behalf of goals or basic preferences could be relevant to their actual goal-pursuit behaviors, especially those that may involve conflicts between their present versus future self, or between their own versus other people's interests. Research on children's behaviors in these situations has revealed that preschoolers have some basic abilities to consider benefits for their future self when making choices (e.g., Lemmon & Moore, 2007; Suddendorf & Busby, 2005), but they often focus on their present preferences and do not prioritize their future selves over their present selves (e.g., Atance & Meltzoff, 2006; Metcalf & Atance, 2011). Between preschool and the early elementary school years, there is significant development in children's ability to control impulses (e.g., Herrmann, Misch, Hernandez-LIoreda, & Tomasello, 2015) and their other-regarding preferences (Fehr, Bernhard, & Rockenbach, 2008). Given these findings, it will be interesting to see whether children's beliefs

about people's tendencies to act on goals or preferences develop in parallel with their behaviors.

Across three studies, we presented children with stories featuring situations in which a character has an overall goal and can only achieve it by taking an action that is against her basic preferences. We understand that goals may differ in terms of their actual significance (e.g., to survive vs. to have a cherry on top) and thus may have differential power in terms of motivating behaviors. To make the situations representative and also accessible to young children, we focused on everyday situations that children may have some experience with (e.g., choosing what activity to play with a friend or what to eat for lunch). These situations also often elicit inner conflicts, and it is common for people to either pursue or give up their goals, so they are relatively open to different possibilities and allow us to see what children's default expectations may be. We were especially interested in 4- and 5-year-olds' predictions of goal-directed behaviors in these situations, but we also included a sample of 6- and 7-year-olds to explore potential developmental changes based on the literature on children's predictions of rule-based behaviors (e.g., Chernyak et al., 2013; Lagattuta et al., 2010). The major question of interest was when preferences conflict with goals, whether children would predict a person would act against basic preferences to fulfill an important goal.

Study 1

Study 1 explored children's predictions of goal pursuit behaviors in a play situation. We chose playing because it is one of the most familiar settings for young children and often involves conflicts between prosocial goals and basic preferences in activities. Like in our daily life, the goal in our scenarios differed from the preference in at least two ways: Compared to the preference, the goal was more valued by the character and more deliberately desired by the character. Therefore, to convey information about the goal, we told children the character "really wants" something to happen, which emphasizes the valued and active nature of the goal. In contrast, to present information about the basic preferences, we simply told children the character "likes" one option and "does not like" the other option, which conveyed the relatively stable nature of the preferences.

To make sure the goal information was salient to even the youngest children, we emphasized the goal of the characters at the end of the scenarios for both stories. Pilot testing suggested that even the youngest children could understand and distinguish what the character really wanted at the moment versus what the character simply liked and disliked. We presented 4- to 7-year-olds with two stories in which a character has the goal of playing with another character (modified from Ziv & Frye, 1999). In the *Prosocial Conflict* story, the main character had a goal to play with the partner, but her preferred activity differed from that of her partner, leading to a conflict for the main character between her goal and her preference. To assess children's basic ability to predict goal-directed behaviors when no conflicting preferences are present, we also included a *Prosocial No-Conflict* story. In this story, the main character also had the goal of playing with the partner, but she did not have a specific preferred activity, so there was no conflict between the goal and the preference for the central character. The child was asked to predict what the character would propose to play with her partner for each story.

Method

Participants. We conducted a power analysis to predetermine our sample size. According to exiting research on children's predictions of behaviors based on preferences and rules, a sample size of about 20 participants in each age group was appropriate for 95% power to detect effects similar to those previously reported in the literature (e.g., Lagattuta et al., 2010). We obtained parental consents for 64 4- to 7-year-olds (35 girls, range = 48 to 83.8 months, M = 66.0 months, SD = 14.0) from two preschools and two afterschool programs in an Eastern United States city. Participants were then divided into three groups based on age upon testing: 4-year-olds (n = 21; M = 51.2 months, SD = 3.1), 5-year-olds (n = 23, M = 64.0 months, SD = 3.0), and 6- and 7-year-olds (n = 20; M = 83.8 months, SD = 7.0). The majority of the children were from white middle class families in the area. All studies presented in this paper were part of a larger research program on 4- to 7-year-old children's predictions of behaviors in social and learning situations, and the overall research project has Institutional Review Board approval from University of Pennsylvania, project title "Children's Learning From Expert," protocol # 812763.

Procedure. Four- and 5-year-olds were tested individually in a quiet room at the preschool during normal daytime hours, and 6- and 7-year-olds were tested in the same room but after school hours when they came to join the afterschool program. The child was first introduced to the characters and asked to name the figures before hearing each story. Children did not have difficulties recognizing the toy figures. All children confirmed that they were familiar with the activities in the story (hide and seek, playing blocks, reading, and watching cartoons). After this warm-up phase, each child heard both stories in a counterbalanced order in a 10-min session. For the *Prosocial No-Conflict* story, the child was told, "This is Ariel (point to the figure) and this is Sleeping Beauty (point to the figure). Ariel does not like to read. She likes to watch cartoons. Now Sleeping Beauty really wants to play with Ariel; she really wants Ariel to play with her." The narrative for the *Prosocial Conflict* story was, "This is Snow White (point to the figure) and this is Belle (point to the figure). Snow White does not like to play blocks. She likes to play hide and seek. Belle likes to play blocks. She does not like to play hide and seek. Now Belle really wants to play with Snow White; she really wants Snow White to play with her." Four Disney toy figures were used to act out the stories. The identity of the main character in each story and the activities they preferred to play were counterbalanced across participants within each age group.

Immediately after the child heard each story, he or she was asked two memory questions in a counterbalanced order: (1) *Preference* question: What does Snow White (Ariel) like to do? What does Belle (Sleeping Beauty) like to do? (2) *Goal* question: Does Belle (Sleeping Beauty) want to play with Snow White (Ariel) or not? Feedback was provided if children did not give correct answers to any of the memory questions.

After the memory questions, the child was asked the test question: Belle (Sleeping Beauty) really wants Snow White (Ariel) to play with her; what do you think Belle (Sleeping Beauty) will say to Snow White (Ariel), play blocks (read) or hide and seek (watch cartoons)?

Results and Discussion

Scoring. Children's responses to the memory and test questions were coded as 1 or 0. For each of the two memory questions, children got a score of 1 if they correctly identified the characters' preferences or the central character's goal of playing with the partner. For the test questions, children got a score of 1 if they responded with the preferred activity of the partner (goal-oriented response), and they got a score of 0 if they answered with the disliked activity of the partner (preference-oriented response).

Analyses and results. Children performed very well on the memory questions. All children remembered the preferences of the two characters correctly. All children, except two 4-year-olds, acknowledged that the main character wanted to play with the partner. Excluding these two children did not affect the results and they were included in the analyses. No effects of gender or testing locations were found on children's responses, so these variables were not included in subsequent analyses.

Children's mean responses for the test questions are presented in Figure 1 by age and story type. To get a first understanding of the patterns revealed in Figure 1, we compared children's responses for each story to a chance level of 0.5 out of 1. Binomial tests indicated that for the *Prosocial Conflict* story, 4-year-olds were below chance ($p = .027$), 5-year-olds were at chance ($p = .68$), and 6- and 7-year-olds were above chance ($p = .041$). In contrast, for the *Prosocial No-Conflict* story, 4-year-olds were at chance ($p = .38$), and 5-, 6-, and 7-year-olds were all above chance ($ps < .011$).

To compare children's responses for the two stories directly, while respecting the repeated and dichotomous nature of the data, responses were analyzed in a mixed-effect model, with choices for the two stories nested within participants. We used age group (4-, 5-, and 6- and 7-year-olds) and story type (*Prosocial No-Conflict* vs. *Prosocial Conflict* stories) to predict children's goal-oriented responses. Overall, children made goal-oriented choices 62% of the time, but this varied as a function of the age group, $\beta = .03$, $SE = .01$, $p = .004$, as well story type, $\beta = 1.67$, $SE = .52$, $p = .001$. The interaction between age group and story type did not reach significance, $p = .58$. Children's goal-oriented responses increased with age, and overall, children made more goal-oriented responses for the *Prosocial No-Conflict* story ($M = .77$) than for the *Prosocial Conflict* story ($M = .47$).

Given the patterns shown in Figure 1 and the results revealed by the binomial tests, to gain a better understanding of the potentially different patterns for the two stories, log-linear analyses were conducted to analyze the age patterns for the two stories separately. There was an effect for age on children's responses to the *Prosocial Conflict* story, $\chi^2(2, N = 64) = 11.43$, $p = .004$. Further analyses revealed differences in responses between the oldest group and the 4-, $\chi^2(1, N = 41) = 11.27$, $p = .001$, and 5-year-olds, $\chi^2(1, N = 43) = 4.48$, $p = .034$. There was no difference between 4- and 5-year-olds' performances, $\chi^2(1, N = 44) = 1.92$, $p = .17$. Older children were more likely than 4- and 5-year-olds to give goal-oriented responses, predicting the main character would propose the activity preferred by the partner. For the *Proso-*
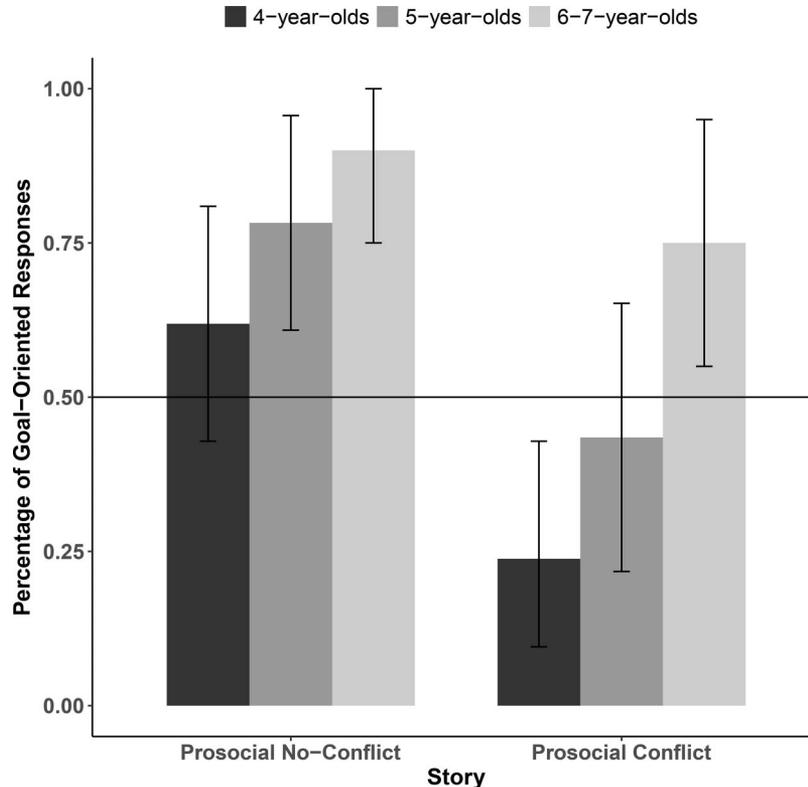

Figure 1. Mean percentage of goal-oriented responses by age for the *Prosocial* stories in Study 1. Error bars are bootstrapped 95% confidence intervals.

cial No-Conflict story, the best-fit model revealed no significant effect of age on children's responses, $\chi^2(2, N = 64) = 4.92$, $p = .30$. Children of all age groups similarly predicted that the main character would propose to play the partner's preferred activity.

To have a better understanding of each age group's responses patterns, we also conducted McNemar's tests comparing children's responses for the two stories within each age group. We found that 4- and 5-year-olds gave more goal-oriented responses to the *Prosocial No-Conflict* story than the *Prosocial Conflict* story ($p = .021$ and $.039$, respectively, for the two ages), whereas older children's predictions of goal-oriented responses were similar for both stories, $p = 38$. These findings suggest that the presence of conflicting preferences mainly reduced goal-oriented responses among the younger children.

To summarize, in this first study, we found evidence for an age difference in children's predictions of goal pursuit behaviors between 4 and 7 years. When the goal conflicted with the person's basic preference, 6- and 7-year-olds were more likely than 4- and 5-year-olds to predict that the character would act in accordance with the goal to play with the partner, rather than act according to the basic preference. The presence of a competing basic preference made children less likely to predict goal-directed actions compared to when no such internal conflicts were involved, especially for the younger children. These findings provide initial evidence that between ages 4 and 7, children increasingly recognize that a person would act against their preferences to pursue prosocial goals.

Our stories in this study involved play situations, which had the advantage of presenting conflicts and prosocial goals that are familiar to young children. But two factors with play situations might limit young children's predictions of goal-directed actions. The first factor is the relevance of perspective-taking skills. To predict the goal-oriented action, the participant needed to understand from the partner's perspective which option would make her want to play with the central character. Indeed, younger children did not respond above chance for the *Prosocial No-Conflict* story. This result might be partially due to the fact that the activities in that story were not very interactive (i.e., reading and watching cartoons), and at the same time it also shows that perspective taking in this type of situation might be challenging for this age group. Second, the *Prosocial Conflict* story involved two characters and their opposing preferences. In order to predict what the initiator would do, the child thus had to represent the preferences for both individuals rather than the preferences for one person. It has been found that 4-year-olds have difficulty in understanding conflicting preferences between people under certain circumstances (e.g., Moore et al., 1995), so it is possible that representing opposite preferences might have made the story demanding for younger children. Therefore, in the second study, we aim to reduce these demands by using scenarios involving single central characters pursuing intrapersonal goals instead of interpersonal goals.

Study 2

In Study 2, we designed two new *Internal Conflict* stories that each involved a single individual pursuing goals that conflicted with his or her basic preferences. In both stories, the central characters had a personal goal (i.e., to lose weight or obtain good test scores) that conflicted with their basic preferences (i.e., liking chocolate but not broccoli or liking watching cartoons rather than doing homework). The child was asked to predict what the character would do—to act against the preference but in accord with the goal (i.e., eat broccoli or do homework), or to act to fulfill the preference rather than the goal (i.e., eat chocolate or watch cartoons).

A second objective of Study 2 was to compare children's goal-oriented predictions to their normative expectations. Research shows that young children could differentiate between what a person should do and what a person will do in prosocial situations (Smith, Blake, & Harris, 2013). For example, in a sharing situation, even preschoolers understand that they should share equally with others, but nevertheless predicted that they would favor themselves (Smith et al., 2013). We were interested to see whether there was a similar discrepancy between children's predictions and normative expectations for our goal pursuit situations. It is possible that older and young children differ in their views about what is the right thing to do: Younger children may think a person ought to or is justified to fulfill basic preferences despite the presence of the goal, and with age they may gain better insights about the necessity to go against preferences to pursue goals. Alternatively, it could also be the case that young children might understand what a person should do to pursue their goals, but they do not believe a person would really do so, so what changes with age is not their normative understanding but their intuitions about people's behavioral tendencies. Comparing children's responses for what the characters will do versus should do would help us examine these two possibilities and thus may clarify the developmental change in children's reasoning in the goal pursuit situations.

Method

Participants. The same 64 4- to 7-year-old children in Study 1 participated in this study (35 girls, range = 48 to 83.8 months, $M = 66.0$ months $SD = 14.0$). Testing the same children would allow us to directly compare the two studies and would give us greater power to detect any differences in children's responses. We tested the children two weeks after they participated in Study 1. The delayed testing was chosen to reduce the possibility that children would make an explicit connection between the two studies.

Procedure. We followed the same procedure as in Study 1. Children were first introduced to the characters and activities before hearing each story. Children had no difficulty in understanding the activities and choices. Each child then heard two stories (*Food* story and *Academic* story) in a counterbalanced order after this warm-up phase. In the *Food* story, the main character had a goal of losing weight, but his preferences for food conflicted with this goal (i.e., likes chocolate and dislikes broccoli). In the *Academic* story, the main character had a goal of doing well on an upcoming test, which conflicted with his preferred activity (i.e., likes watching cartoons and dislikes doing homework). Children were explicitly introduced to the options in terms of whether the characters liked or disliked them as well as whether they were helpful or unhelpful for the goal. Pilot testing indicated that children of all ages did not have difficulties in understanding that eating broccoli and doing homework were more helpful than the alternative options for the characters' goals.

An elephant puppet and pictures for chocolate and broccoli were used to act out the *Food* story. A toy figure and pictures for pencils

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and paper and cartoons on TV were used to act out the *Academic* story. After hearing each story, participants answered two memory questions regarding the central character's goal and preference. Feedback was provided if the child answered any of the memory questions incorrectly. The child was then asked the *Prediction* question about what the character would do and the *Normative* question about what the character should do in a randomized order.

Results and Discussion

Scoring. As in Study 1, children got a score of 1 for each memory question if they answered correctly about the goal or the preferences of the main characters. They received a score of 0 for each incorrect answer. For the test questions, children received a score of 1 if they predicted the central character would or should choose the not preferred but useful activity or food (goal-oriented response). They got a score of 0 if they predicted the character would or should choose the preferred but unhelpful activity or food (preference-oriented response).

Analyses and results. Children did well on the *Memory* questions. All age groups answered correctly about the main characters' preferences for the activity or food. All but one 4-year-old answered correctly for the main goal of the main character. Excluding this child did not affect the results, and she was included in the analyses. There were no effects for gender or the order for the stories, so these variables were not included in subsequent analyses.

To examine the effects of age and question type on children's responses, we analyzed children's responses in a mixed model, with responses to the two test questions for the two stories nested within participants. We used age group (4-, 5-, and 6- and 7-year-olds) and question type (*Will* vs. *Should* questions) to predict children's goal-oriented responses. Overall, children predicted goal-directed actions 64% of the times, but this percentage varied as a function of the age group, $\beta = .03$, $SE = .01$, $p < .001$, as well as question type, $\beta = 3.09$, $SE = .50$, $p < .001$. No interaction effect between age group and story type was found, $p = .63$. Children's goal-oriented responses increased for both questions with age, and overall, children made more goal-oriented responses for the *Should* question ($M = .86$) than for the *Will* question ($M = .42$).

Further simple effect analyses indicated that for the *Will* questions, there was an effect of age in predicting children's goal-oriented responses, $\beta = .03$, $SE = .01$, $p = .002$. Six- and 7-year-olds were more likely to predict the character would act according to the goal than 5- ($\beta = .02$, $SE = .01$, $p = .03$) and 4-year-olds ($\beta = .04$, $SE = .01$, $p = .002$). There were no significant differences between 5- and 4-year-olds in their responses, $\beta = 1.71$, $SE = .96$, $p = .07$. Looking at each age group separately, the oldest group was more likely to predict the character would act according to the goal than according to the preference, $\beta = .73$, $SE = .34$, $p = .03$; 5-year-olds were equally likely to predict goal-oriented responses and preferences-oriented responses, $\beta = .52$, $SE = .51$, $p = .31$; and 4-year-olds were more likely to predict the character would act according to preference than act according to the goal, $\beta = 6.23$, $SE = 2.95$, $p = .03$. The patterns are similar to that for the *Prosocial Conflict* story in Study 1; a nonparametric Friedman test of differences among repeated measures was conducted and revealed no differences between

children's responses to the stories in these two studies, χ^2 (2, $N = 64$) = 4.8, $p = .091$. Figure 2 displays these results.

For the *Should* question, in contrast, the age effect in children's responses did not reach significance, $\beta = .03$, $SE = .02$, $p = .09$. All age groups were more likely to indicate the character should act according to the goal than act according to the preference of the character, $ps < .03$ (see Figure 2).

Similar to the findings in Study 1, these results revealed an age-related change in children's goal-oriented predictions between ages 4 and 7 years. We found that older children were more likely than 4- and 5-year-olds to predict goal-oriented behaviors when the person's goal conflicted with his or her basic preference. These stories involved goal pursuit within a single individual and did not involve social interactions, so perspective-taking skills or the ability to represent competing preferences between individuals could not account for younger children's fewer predictions of goal-directed actions compared to older children. Moreover, children of all ages gave more goal-oriented responses to the normative question about what the character should do in the situation, suggesting factors other than normative considerations played a role in children's predictions of people's goal pursuit actions.

One factor that could potentially affect children's responses is children's inhibitory control ability. There is evidence that even 4-year-olds have some rudimentary abilities to hold information in mind and inhibit dominant responses (e.g., Davidson, Amso, Anderson, & Diamond, 2006). By using a reasoning task instead of a participatory task, the relevance of inhibitory control was already reduced in our previous stories. Nevertheless, it could still be true that older children have more advanced inhibitory control (Davidson et al., 2006), which might affect children's cognitive reasoning ability to some extent. The options of eating chocolate and watching cartoons are intuitively appealing to most children. Younger children might not be able to inhibit the tendency to blurt out these attractive options. Younger children might also have projected their own preferences to the central character and thus predicted behaviors based on what they themselves would want in the situations. Reducing the attractiveness of the preferred options with a novel goal and preferences may help minimize the influence of these factors and facilitate younger children's goal-oriented responses.

Moreover, the goals for scenarios in Study 2 (losing weight and getting good grades) may seem to be stereotypically long-term goals—one instance of compliance or deviation might not help or fail those goals. Therefore, if children do not value or pay enough attention to future goals, they may simply focus on the more pleasant choices in the present. There is evidence that when making choices for themselves, preschoolers often focus on their present preferences and do not prioritize their future selves over their present selves (e.g., Atance & Meltzoff, 2006; Metcalf & Atance, 2011). Another limitation of using these long-term goals is that these goals could potentially be more abstract and less familiar for younger children, which might have posed additional demands for them. To reduce the relevance of future thinking and the processing demands, in Study 3, we used a more concrete novel goal that does not involve long-term consequences and can be achieved immediately with one single action.
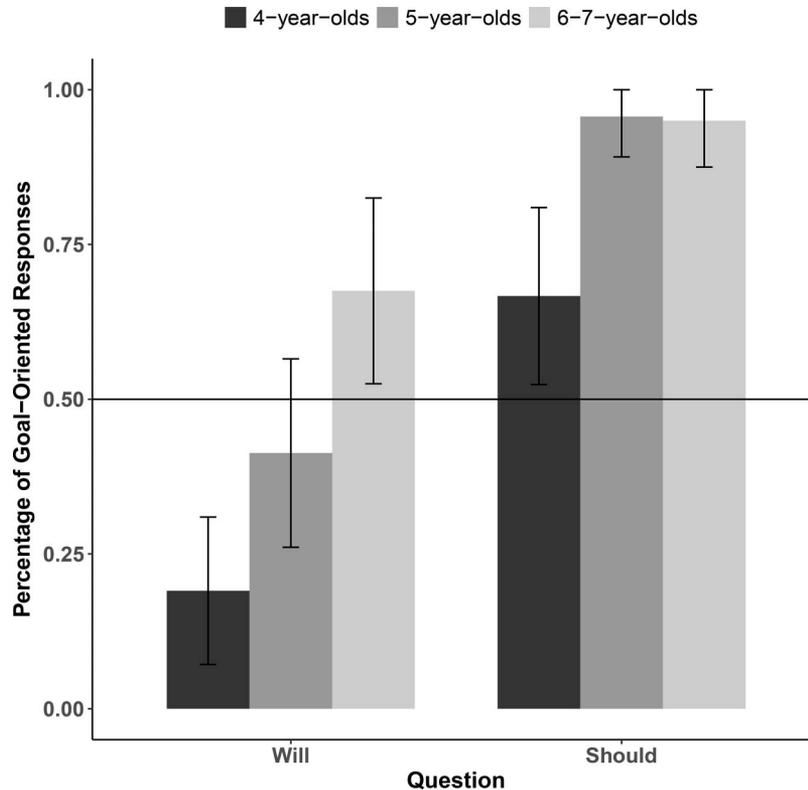
Figure 2. Mean percentage of goal-oriented responses by age and question for the *Goal Pursuit* stories in Study 2. Error bars are bootstrapped 95% confidence intervals.

Study 3

In Study 3 we designed a *Novel Goal* story that involved a concrete novel goal and preferences that children would not have a prior belief about and do not require future thinking. In this story, the main character's goal was to feel "blarb," which conflicted with her preferences for two novel fruits. The character liked the taste of the fruit that was not helpful for feeling "blarb" and disliked the taste of the fruit that could make the person feel "blarb." The child was asked to predict which fruit the character would choose to eat (*Prediction* question). They were also asked about which fruit the character should eat (*Should* question). Pilot testing confirmed that children did not have preexisting beliefs about the goal or the basic preference. This story allowed us to examine whether children's goal-oriented responses would be facilitated when attributions of their own preferences or lack of impulse control were less likely to interfere.

Method

Participants. Participants were 45 children from four preschools and two afterschool programs in the New England area. There were 15 4-year-olds (7 girls, range = 48 to 58 months, $M = 54.1$ month), 15 5-year-olds (9 girls, range = 60 to 67 months, $M = 62.7$ months), and 15 6- and 7-year-olds (10 girls, range = 74 to 96 months, $M = 87.6$ months). Based on the results from Studies 1 and 2, a sample size of 15 per age group would be

sufficient to have 95% power to detect potential age effects. The majority of participants were from white middle class families.

Procedure. We told the *Novel Goal* story to the children while showing them illustrative pictures on a computer screen. In the story, the character had a goal of feeling "blarb" that conflicted with her preferences for the fruits. The preferred fruit was not useful for feeling "blarb," while the disliked fruit could make her feel "blarb." There is evidence that telling children explicitly that characters were thinking about rules or consequences increased their willingness to attribute good feelings to the inhibition of immediate desires (Lagattuta, 2008). To see whether further emphasizing the goal would facilitate goal-oriented predictions especially among the younger children, we emphasized in the end that the goal "is the most important thing for her right now." Two solid circles, one green and the other orange, depicted the two novel fruits. The fruit preferred by the character was counterbalanced across participants.

We followed a similar procedure as in Studies 1 and 2, except that to make sure the child understood the critical information about the novel fruits, in addition to the *Preference* question (which fruit the character liked), the child was also asked a *Function* question, about which fruit would help the character feel blarb. The memory questions were asked in a randomized order across participants. After the memory questions, the child was asked which fruit the character would eat (*Prediction* question) and which fruit the character should eat (*Normative* question) in a

randomized order. The session lasted about 5 minutes. The story and questions are presented in the Appendix.

Results and Discussion

Scoring. Coding for responses was similar to that in previous studies. Children received a score of 1 for answering each memory question accurately and a score of 0 for each incorrect answer. Children got a score of 1 on the test questions by responding that the character would or should eat the helpful but disliked fruit (goal-oriented responses), and they received a score of 0 for responding with the preferred but unhelpful option (preference-oriented responses).

Group differences. All age groups answered the memory questions correctly. All but three 4-year-olds and one 5-year-old answered the *Preference* question correctly, and all but two 5-year-olds answered the *Function* question correctly. The children who failed the memory questions were able to pass the questions after receiving one round of feedback. Excluding the children who failed the memory questions did not affect the results and they were included in subsequent analyses.

Children's mean responses for the test questions are presented in Figure 3 by age and question type. We analyzed children's responses in a mixed-effect model, with choices for the two questions nested within participants. We used age group (4-, 5-, and 6- and 7-year-olds) and question type (*Will* vs. *Should* questions) to predict children's goal-oriented responses. Overall, children made

goal-oriented choices 56% of the times, but this percentage varied as a function of the age group, $\beta = 22.29$, $SE = 4.32$, $p < .001$, as well as question type, $\beta = 21.45$, $SE = 5.04$, $p < .001$. No interaction effect between age group and question type was found, $p = .90$. Children's goal-oriented responses increased for both questions with age, and overall, children made fewer goal-oriented responses for the *Will* question ($M = .42$) than for the *Should* question ($M = .69$).

Further analyses of the simple effects indicated that there was an effect of age in predicting children's responses to the *Will* question, $\beta = 1.68$, $SE = .51$, $p = .001$. Six- and 7-year-olds were more likely to predict the character would act according to the goal than 5- ($\beta = 2.08$, $SE = .85$, $p = .01$) and 4-year-olds ($\beta = 11.98$, $SE = 3.42$, $p < .001$). There were no significant differences between 5- and 4-year-olds in their responses, $\beta = 1.18$, $SE = .94$, $p = .21$. Binomial tests revealed that 4-year-olds were below chance ($p = .007$), 5-year-olds were at chance ($p = .30$), and 6- and 7-year-olds were above chance ($p = .035$). There was a marginal trend that children's goal-oriented responses to the *Should* questions increased with age as well, $\beta = 2.14$, $SE = 1.20$, $p = .07$.

The results were largely in agreement with previous findings in Studies 1 and 2. When a character had a goal that conflicted with a preference, 6- and 7-year-olds were more likely than 4- and 5-year-olds to predict that the character would act according to the main goal, even if the goal was novel, short-term, and emphasized.
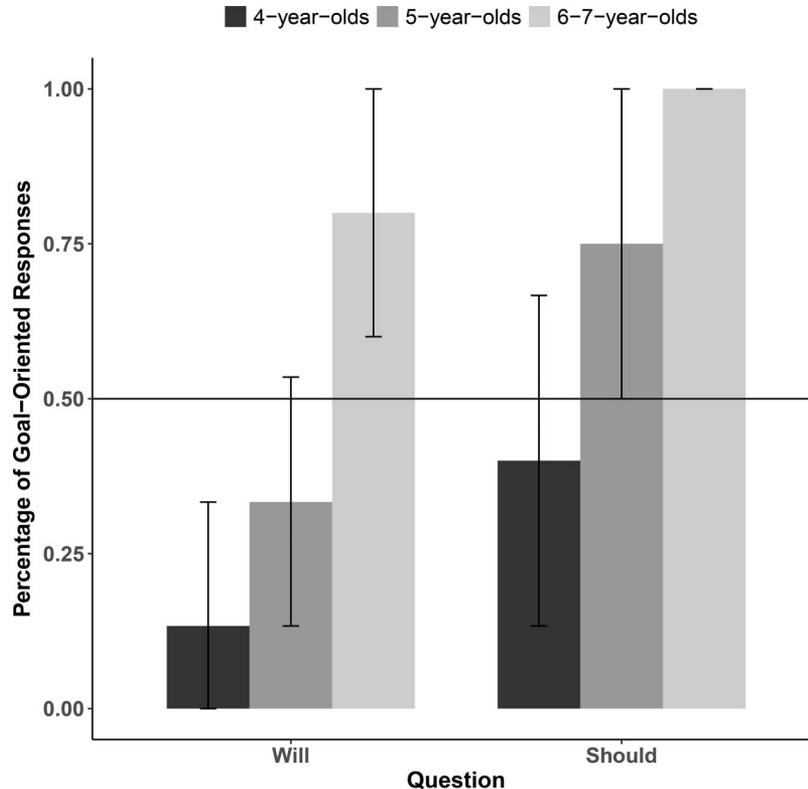

Figure 3. Mean percentage of goal-oriented responses by age and question for the *Novel Goal* story in Study 3. Error bars are bootstrapped 95% confidence intervals.

Reducing the influence of existing beliefs and attractiveness of the preferences and goal did not change the developmental pattern. Young children's responses could not be accounted for by the attribution of their own preferences or a lack of impulse control, because the preferences and the goal were novel to them. Limited future thinking skills also could not be responsible, because the goal of feeling "blarb" could be achieved immediately by taking one of the fruits, which was not more into the future than the competing option. Finally, children overall gave more goal-oriented responses to the *Should* question than the prediction question, suggesting that children did not rely solely on normative considerations to predict people's actions.

General Discussion

Across three studies, we found a consistent age difference in children's predictions of goal-directed behaviors. When presented with situations involving a character who has an important goal conflicting with basic preferences, 6- and 7-year-olds were more likely than 4- and 5-year-olds to predict the character would act in accordance with the goal instead of fulfilling the basic preferences. Reducing several potential task demands (e.g., perspective taking skills, impulse control) did not increase younger children's goal-oriented responses. Children's responses were consistent across prosocial, intrapersonal, and novel situations. These findings suggest that between ages 4 and 7, children increasingly realize that a person would act against basic preferences to pursue goals.

Goals and preferences are both salient mental constructs for young children. By age 2, infants and toddlers attribute goals and preferences to individuals and predict actions based on them (Falck-Ytter et al., 2006; Krogh-Jespersen & Woodward, 2014; Repacholi & Gopnik, 1997; Wellman & Woolley, 1990; Woodward, 1998). Our results suggest that when goals and preferences are in conflict, with age children increasingly predict behaviors based on goal information. The pattern has been observed regarding children's predictions of rule-based actions. When individuals' preferences conflict with external constraints such as rules and norms, 4- and 5-year-olds were equally likely to predict the individuals would act according to rules or basic preferences (Bernard et al., 2016; Kalish & Shiverick, 2004; Lagattuta et al., 2010).

With age, children are more likely to predict individuals would act against basic preferences to comply with moral rules (Lagattuta et al., 2010). Therefore, in spite of the fact that goals are typically internal and presumably might have more motivating power compared to rules, young children are not more likely to predict goal-directed behaviors than rule-based behaviors. Young children view preference as one of the strongest motivational sources for people's behaviors, and between ages 4 and 7 children gradually give more weight on other external and internal motivating sources to predict people's actions. This change allows children to predict actions that are different from those that are typically associated with preferences.

This pattern is also consistent with previous findings on the development of children's understanding about conflicting mental states. Children under 7 years do not spontaneously generate situations that would elicit mixed emotions (e.g., Harter, 1983), and they often deny that different emotions could coexist simultaneously within the same individual (Harris, 1983; Harter & Buddin, 1987; Kestenbaum & Gelman, 1995). Choe, Keil, and

Bloom (2005) found that when a character expressed preferences toward a target but then refrained from obtaining it, only 7-year-olds and adults, but not younger children, explained the character's action in terms of having conflicting preferences in mind. It is possible that as children become more aware of conflicting mental states between ages 4 and 7, they may also be more likely to appreciate the functions of a competing goal—leading individuals to act against basic preferences.

Why are 4- and 5-year-old children less likely than older children to predict goal-oriented behaviors in the face of conflicting preferences? The present studies may not provide a conclusive answer, but the data may give us some useful hints and also help rule out otherwise plausible accounts. Across our studies, we have tried to control multiple potential confounding factors (e.g., perspective-taking skills, future thinking and impulse control abilities), and these factors do not seem to be underlying young children's predictions. In addition to these factors, one possible reason that younger children were less likely to give goal-oriented responses could be motivational—younger children might not value the goals as much as older children do. Preschoolers may have limited experiences with setting personal goals, and they may simply care more about having fun and thus predict the person's actions based on their perceived "desirability" of the options. In our stories, to make sure the goal information was salient to children, we emphasized it at the end of all stories, and children of all ages had no difficulty in acknowledging the goals. The consistent responses across the variety of contexts also speak against this possibility. Playing with other children may certainly be important for both younger and older children. More to the point, feeling "blarb" was a novel goal for all participants. Nevertheless, younger children's responses were not different in these situations, suggesting the attractiveness of the goal to the child could not be the main factor underlying the pattern of their predictions.

We also explored the possibility that children might predict individuals' goal-directed behaviors based on normative expectations. We found that, overall, children of all age groups made fewer goal-oriented responses to the *Will* question than to the *Should* question.

A similar discrepancy between predictions and normative considerations has been observed in young children's predictions of their own sharing behaviors. Preschoolers know they should share equally with others, but they do not predict they would do it that way until age 7 (Smith et al., 2013). Based on the dissociation between children's responses to what one "should" do and what one "will" do, we cannot rule out the possibility that normative expectations may play some role in children's predictions in our study. It is possible that as children gain more insight into what the person should do, they may also be more likely to predict the person will do that. At the same time, our findings also suggest that children did not rely solely on normative considerations to make predictions and other factors could be influencing children's goal-oriented responses.

One possibility could be that with age children also increasingly view people as more likely to pursue the normally good option. In other words, their intuitions about people's ability to resist temptations and act against their own preferences may change. Supporting this view, it has been found that children's concept of free will adjusts between ages 4 and 6 (e.g., Chernyak & Kushnir, 2014; Chernyak, Kushnir, & Wellman, 2010;

Kushnir et al., 2015). Four-year-olds understand people have freedom for physically possible and morally good actions, but it is not until kindergarten that children start to acknowledge people's freedom to act against their own preferences. In fact, recent evidence suggests that 3- to 5-year-olds view internal conflicts as inherently negative and only at ages 7 or 8 do they appreciate decisions and actions done out of willpower and self-control (Starmans & Bloom, 2016). It is thus possible that young children do not believe that people are able to act in ways that are inconsistent with their own preferences, which prevents them from predicting goal-directed behaviors in our study. It will be interesting to test whether children, if explicitly told about an individual with high self-control abilities, would be more likely to predict the person would act against preferences to pursue goals. If they predict more goal-oriented behaviors for the high self-control individuals, it would suggest that the concern for the inability to act against preferences might be underlying young children's intuitions about ordinary individuals.

Across the studies we have tried to include a variety of goals and situations. Children's responses were largely consistent across different situations, but it does not exclude the possibility that the nature of the goals may play a role in children's goal-oriented predictions. For example, we have not examined children's predictions for salient goals with really serious consequences (e.g., to avoid getting sick or hurt), and it will be worthwhile to explore whether young children predict more goal-oriented responses for these situations. Using a combination of familiar and novel goals that are concrete and immediate will be most helpful for probing younger children's understanding.

Children's predictions of goal-directed actions might be facilitated by a combination of experiential and social cultural influences. For example, 6 and 7 years is the typical age for American children to attend school. The formal school setting requires children to set and complete goals as well as imposing more discipline and self-control than preschool (e.g., Perry & Weinstein, 1998). Consequently, children may have more chances to experience conflicts between goals and preferences during this period, as well as observe others overcome competing preferences to pursue social or academic goals. These first-hand experiences and observations may contribute to the conceptual appreciation of the conflicting mental states. Moreover, cultural values transmitted through socialization processes may also play a role in children's understanding. Some cultures may emphasize the inhibition of personal preferences more than other cultures do. For example, traditional Confucian values emphasize that individuals should display actions consistent with norms and rules when they are in conflict with personal preferences (Ho, 1986). The group orientation in East Asian cultures also emphasizes that individuals should fulfill group and social goals, even at the expense of other personal preferences. Comparing cultures with different emphasis on resistance of temptations may provide insight into the social-cultural mechanism for the development of goal-oriented thinking.

Children's understanding of goal-pursuit behaviors in situations when goals and preferences conflict might be relevant to a variety of behaviors in self-regulation, prosocial, or learning situations. Between preschool and middle childhood years, children become increasingly able to prioritize their future self and control present impulses (e.g., Atance & Meltzoff, 2006; Herrmann et al., 2015; Metcalf & Atance, 2011; Mischel et al., 1972; Mischel et al., 1989). In the interpersonal domain, 7- and 8-year-olds are more able than preschoolers to have other regarding preferences and share in egalitarian ways (Fehr et al., 2008), as well as being more aware of the emotional benefits for making prosocial sacrifices (Weller & Lagattuta, 2013, 2014). Research on metacognition reveals that by age 7 children are also more able to adopt effective learning strategies even if they are challenging and less pleasant (Dufresne & Kobasigawa, 1989; Lockl & Schneider, 2004). What these situations have in common is that they all involve conflicts between the fulfillment of basic preferences and the pursuit of goals. It is possible that once children understand that a person has to act against one's preferences to pursue goals, they may be more likely to act in accordance with the goal instead of the basic preferences. Conversely, first-hand experiences may also help children to understand a person may act against preferences to fulfill goals. Longitudinal or training studies will be valuable in shedding light on the causal relations between the two.

To conclude, across three studies we found an age difference in children's prediction of goal-directed behaviors. In situations when individuals have conflicts between basic preferences and important goals, 7-year-olds were more likely than preschoolers to predict that the individuals would act against their preferences to pursue goals. Preschool children did not predict goal-oriented behaviors across a variety of situations, even when perspective-taking skills, impulse control, or future-thinking abilities were minimized. Taken together with the findings on children's predictions of behaviors based on rules (Bernard et al., 2016; Kalish & Shiverick, 2004; Lagattuta et al., 2010) and their concept of free will (Chernyak & Kushnir, 2014; Chernyak et al., 2010; Kushnir et al., 2015), the results suggest that preschool children view preferences as one of the strongest constraining forces on people's actions, and this view is gradually modified to reflect the potentially greater motivating power of other internal and external sources in some contexts. As children gain deeper insights into the necessity and possibility for people to act against their preferences to pursue goals, they might be more conscious and prepared to give their own answers to the hard choices in life, such as to save the world or to savor it.

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Appendix

Stories and Questions for Studies 2 and 3

Stories in Study 2

The Food Story. This is the Elephant. The Elephant really wants to lose weight. Eating broccoli can help him to lose weight; eating chocolate will only make him put on weight. The elephant likes the taste of chocolate; he does not like the taste of broccoli. The Elephant really wants to lose weight right now.

Memory Questions.

1) *Preference* question: What does the Elephant like? What he does not like?

2) *Goal* question: Does the Elephant want to lose weight or not?

Test Questions. The elephant really wants to lose weight. What will (should) the Elephant eat? Broccoli or chocolate?

The *Academic* Story. This is Tom. Tom really wants to get a good score on tomorrow's test. To get a good score, he has to do his homework and he cannot watch cartoons. Tom likes watching cartoons; he does not like doing homework. Tom really wants to get a good score for the test.

Memory Questions.

1) *Preference* question: What does Tom like? What he does not like?

2) *Goal* question: Does Tom want to get a good score for the test or not?

Test Questions. Tom really wants to get a good score today. What do you think Tom will (should) do? Do homework or watch cartoons?

Story in Study 3

The Novel Goal Story. This is Mary. There is a very good feeling called "blarb," and Mary really wants to feel "blarb" today. Here are two fruits. The green fruit will make her "blarb," the orange fruit will not. Mary likes the taste of the orange fruit; she does not like the taste of the green fruit. Mary really wants to feel "blarb." It's the most important thing for her right now.

Memory Questions.

1) *Preference* question: Which fruit does Mary like? Which she does not like?

2) *Function* question: Which fruit can make Mary feel "blarb"? Which fruit cannot?

Test Questions. Mary really wants to feel "blarb" today. What do you think Mary will (should) eat? The orange fruit or the green fruit?