What Will I Like Best When I’m All Grown Up? Preschoolers’ Understanding of Future Preferences

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Three experiments investigated 3-, 4-, and 5-year-olds’ (N = 240) understanding that their future or “grown-up” preferences may differ from their current ones (self-future condition). This understanding was compared to children’s understanding of the preferences of a grown-up (adult-now condition) or the grown-up preferences of a same-aged peer (peer-future condition). Children’s performance across all three conditions improved significantly with age. Moreover, children found it significantly more difficult to reason about their own future preferences than they did to reason either about an adult’s preferences or the future preferences of a peer. These results have important implications for theories about future thinking and perspective-taking abilities, more broadly.

An understanding of the future is an important aspect of young children’s cognitive development and has recently become the focus of study by a number of researchers (for a review, see Suddendorf & Moore, 2011). Different methods have been used to assess future thinking including tracking children’s future-oriented language (e.g., Busby & Suddendorf, 2005; Weist, 1989), delay of gratification (e.g., Moore, Barresi, & Thompson, 1998), and planning abilities (e.g., Hudson, Shaprio, & Sosa, 1995; Quon & Atance, 2010). Researchers have also assessed children’s ability to select an item or tool in anticipation of future states and needs (e.g., Atance & Meltzoff, 2005; Russell, Alexis, & Clayton, 2010; Scarf, Gross, Colombo, & Hayne, 2013; Suddendorf, Nielsen, & von Gehlen, 2011). Results from these different studies suggest that the ability to think about the future begins to emerge around 3 years of age with notable improvement during the preschool years. Nonetheless, there are important aspects of children’s future thinking that have not yet been fully explored. For example, the research that targets children’s ability to anticipate future states and needs has mostly focused on physiological states or practical needs and less on states that could be described as more emotional or psychological in nature. Children’s understanding that such states also change over time and, more specifically, that their future preferences may differ from their current preferences is the focus of the current study.

Understanding that one’s own preferences can change over time is important to study because it can profoundly impact people’s decision making. Indeed, in adulthood, at least, there is an abundance of research showing that inaccurately predicting future preferences can lead to a host of negative outcomes (e.g., Loewenstein & Angner, 2003; Quoidbach, Gilbert, & Wilson, 2013). For example, getting a large tattoo, buying a flashy sports car, or accepting a job miles from home are decisions that may ultimately result in pain and disappointment when one must undergo expensive laser surgery, trade in the convertible for the family sedan, and feel trapped in a dead-end job far from family and friends. In fact, Quoidbach et al. (2013) recently coined the term “end of history illusion” to explain why adults often make decisions that their future selves regret. They argue that adults at every stage of life tend to underestimate the extent to which...
their personalities, values, and preferences will change in the future.

Although young children are not faced with the same kinds of decisions as adults, it is arguable that they, too, must make choices that require them to acknowledge that what they prefer right now may differ from what they will prefer in the future. For example, when asked how he would like to decorate his “big boy” room, a toddler may choose an Elmo theme claiming “he will always love Elmo” when, in reality, several years down the road, he will ask to redecorate when his new preference has shifted to Spiderman. In fact, early childhood is a period during which activity, food, and toy preferences change continuously and, thus, having an awareness of these changes is important in the life of a young child.

The extent to which children can acknowledge that what they prefer in the present may differ from what they prefer in the future is related to an important question in theory-of-mind (ToM) research, namely: Do young children understand that their preferences can differ from those of others? This understanding has been argued to be of central importance to both young children's cognitive and social development (e.g., Atance, Bélanger, & Meltzoff, 2010; Cassidy et al., 2005; Repacholi & Gopnik, 1997). Some research in this area suggests that by 18 months, children are able to infer diverse food preferences between themselves and others. In one study, they did so by judging the experimenter’s facial expression and offering her the snack she preferred (i.e., broccoli), even when it differed from the one they preferred (i.e., goldfish crackers; Repacholi & Gopnik, 1997). Relatedly, Wellman and Bartsch (1988) and Wellman and Woolley (1990) asked children to choose an item they preferred, told them that a character preferred the other, and finally asked them which one the character would choose. A meta-analysis of these and other studies found that 95% of 3-year-olds accurately judged that two people (i.e., self and other) can have different desires about the same objects (Wellman & Liu, 2004).

In Wellman and colleagues’ paradigm, as in Repacholi and Gopnik’s (1997), children are given explicit information (emotional or verbal) about what the other person prefers. In contrast, when such information is not provided children’s performance is poorer. For example, in their early work on conceptual perspective taking, Flavell, Botkin, Fry, Wright, and Jarvis (1968) asked preschoolers to select gifts for their parents. Gift choices included items that were preferable to the children (e.g., doll, truck) and items that would be preferable to their parents (e.g., silk stockings, necktie). Whereas the older children chose appropriate gifts for their parents (e.g., necktie), 3-year-olds chose the items that they, themselves, preferred (e.g., the toys; see also Atance et al., 2010).

These findings are particularly relevant to the experiments we report in this article because just as children were not given explicit information about their parents’ preferences, they are not likely to have explicit information about their own future preferences. Second, Flavell et al.’s (1968) findings suggest that children’s understanding that preferences may differ across the life span (i.e., children and adults prefer different things) develops during the preschool years. More broadly, during the preschool years—and beyond—children gain a greater awareness that general knowledge may differ between children and adults (e.g., Taylor, Cartwright, & Bowden, 1991) and that infants, children, and adults may have different emotional reactions to the same situation (e.g., Sayfan & Lagattuta, 2008).

However, what none of these studies has addressed is children’s understanding that changes in desires or preferences can occur within the same individual and, within one’s own self, in particular. To our knowledge the only study that has explicitly assessed this issue is one by Gopnik and Slaughter (1991) that included a task aimed at assessing children’s understanding of past to present changes in desire states. Most notably, children were given a task in which they were shown two equally appealing objects (e.g., two picture books or two boxes containing a hidden toy) and were asked to choose the one they desired. Once their desire was satiated (i.e., the book was read or the box was opened and the child was given the toy), children were asked to indicate their current desire. All children now chose the alternate item. However, when asked to recall their past desire, the 3-year-olds’ performance was no better than chance, suggesting that they had difficulty acknowledging that desires (past vs. present) can change over time.

Most of the evidence considered thus far suggests that 3-year-olds will have difficulty appreciating that their future or grown-up preferences will differ from their current preferences, but that this ability will improve substantially between ages 3 and 5. However, this prediction has not yet been empirically tested and thus doing so was the primary goal of Experiment 1. Our secondary goal was to determine whether preschoolers have similar levels of difficulty/ease thinking about their own
future preferences as they do thinking about the preferences of others. That children will perform similarly when asked to identify their future preferences and the preferences of others is supported by the fact that these two forms of perspective taking both develop substantially between ages 3 and 5 (as outlined earlier in the Introduction). This hypothesis is also consistent with recent research on perspective taking in adults and, specifically, the claim that adopting one’s future perspective and adopting the perspective of another person share similar cognitive resources and reflect the workings of the same core brain network (e.g., Buckner & Carroll, 2007; Spreng & Grady, 2010; Viard et al., 2011). In fact, this claim has led some researchers (e.g., Buckner & Carroll, 2007; Spreng & Grady, 2010) to argue that both forms of perspective taking emerge together in human development (see also Moore et al., 1998).

To investigate children’s understanding of their own and others’ preferences, we designed a single task drawing on the work of both Flavell et al. (1968) and Atance et al. (2010). In Atance et al.’s “gift-giving” task, 3-, 4-, and 5-year-olds were presented with two items: one that was preferable to them (i.e., a small plush toy) and one that was preferable to their mothers (i.e., a cooking magazine). They were then asked to select which item would be a “good present” for their Moms as well as which item would be a “good present” for them. Whereas 3-year-olds failed to select the age-appropriate gift for Mom at above-chance levels (in both Experiments 1 and 2), 4-year-olds (above-chance performance in Experiment 2) and, to a greater extent, 5-year-olds (above-chance performance in both experiments) did. In addition, children whose desires had been fulfilled (i.e., had already selected a gift for themselves) chose an appropriate gift for their mothers significantly more often than children whose desires were unfulfilled (i.e., had to choose a gift for their mother first). We adapted Atance et al.’s (2010) gift-giving task by varying the perspective that children were asked about. In Experiment 1, one group of 3-, 4-, and 5-year-olds was asked to reason about the perspective of their future selves, whereas another group was asked to reason about the perspective of an adult.

Experiment 1

We presented children with pairs of “child-” (e.g., Kool-Aid) and “adult-” (e.g., coffee) preferable items and asked them to choose the items that they would like best when they were “all grown up” (self-future condition) or that an adult likes best (adult-now condition). We also asked all children to choose which items they like best right now. Children’s choices on these self-now trials were used as the baseline against which choices in the adult-now or self-future trials were compared.

Method

Participants

Participants were 120 English-speaking children: forty-three 3-year-olds (26 boys; $M_{age} = 41$ months, age range = 36–47 months), forty-three 4-year-olds (21 boys; $M_{age} = 53$ months, age range = 48–58 months), and thirty-four 5-year-olds (18 boys; $M_{age} = 66$ months, age range = 60–71 months). Children were from predominantly White, middle-class backgrounds and were recruited from a medium-sized university city using posters, pamphlets, newspaper and online advertisements, and at children’s fairs.

Procedure

Children were tested individually in a laboratory setting by an experimenter while the parent or guardian watched through live video feed on the computer screen in an adjoining room. All sessions were video recorded. Children completed a perspective-taking task and several additional tasks that will not be discussed here.

Children were randomly assigned to one of two conditions of the perspective-taking task. Each condition required them to reason about their own preferences (self-now trials) and either the preferences of an adult (adult-now trials) or the preferences of their own future self (self-future trials). Thus, all children received two types of trials: self-now trials and adult-now trials in the adult-now condition and self-now trials and self-future trials in the self-future condition.

For each condition, children were presented with the same five trials for each trial type, in random order, each featuring two identical exemplars of a child-preferable item and two identical exemplars of an adult-preferable item, including drinks (Kool-Aid and coffee), “reading” material (picture books and newspapers), games (Play-Doh and crossword puzzles), television shows (Dora the Explorer and cooking videos), and “leisure” activities (sticker books and magazines).
Specific verbal instructions varied as a function of trial type. For the adult-now trials, children were shown a photograph of a sex-matched adult and told: “Here is a picture of Jane/John. She/He is a grown-up woman/man. She/He is as big as your Mommy/Daddy. I’m going to show you some things, and I want you to tell me the things that Jane/John likes best.” For the self-future trials, children were also shown the photograph of Jane/John and were told:

Right now, you’re 3/4/5 years old. But one day, you’re going to be all grown up. You’re going to be as big as this woman/man. Her/His name is Jane/John, and she/he is as big as your Mommy/Daddy. I’m going to show you some things, and I want you to tell me the things you will like best when you’re all grown up.

For the adult-now trials children were then asked, for example, “Which one of these does Jane/John like best, one of these magazines or one of these sticker books?” whereas for the self-future trials they were asked: “Which one of these will you like best when you’re all grown up, when you’re as big as Jane/John, one of these magazines or one of these sticker books?” The photograph of Jane/John remained on the table and visible during the adult-now and self-future trials.

As mentioned, all children were also given the same five trials just described, but worded as follows: “I want you to tell me the things you like best right now,” to establish a baseline measure of their current preferences. Children either received these self-now trials immediately before the adult-now/self-future trials or immediately after. The order of presentation and placement of the adult- and child-preferable items was randomized for each of the 10 trials.

Scoring

Children’s choice on any given adult-now or self-future trial was only included in the analysis if the child-preferable item was chosen on the corresponding self-now trial. Otherwise, it was impossible to determine whether children who held atypical preferences (e.g., preferred coffee to Kool-Aid) were indeed adopting the perspective of the adult/future self and not merely stating their own current preference. It is important to note that the majority of children (85%) chose either 4 or 5 of the child items on the self-now trials with only a minority (15%) choosing either 1, 2, or 3. Scores on the perspective-taking task were then calculated by dividing the number of adult items selected on the adult-now or self-future trials (possible range = 0–5) by the number of child items selected on the self-now trials (possible range = 0–5), with the resulting proportion score ranging from 0 to 1.

Results

Preliminary Analyses

Age differences between conditions were not significant—3-year-olds: $M = 40.62$, $SD = 3.25$ and $M = 42.23$, $SD = 2.79$, $t(41) = 1.74$, $p = .089$; 4-year-olds: $M = 52.59$, $SD = 3.49$ and $M = 53.95$, $SD = 3.38$, $t(41) = 1.30$, $p = .201$; 5 year-olds: $M = 66.19$, $SD = 4.23$ and $M = 65.06$, $SD = 4.12$, $t(32) = -.79$, $p = .436$—in the self-future and adult-now conditions, respectively. In addition, an analysis of variance (ANOVA) revealed no significant main effect of sex or significant interactions of sex with any other variable on perspective-taking scores and so the data were collapsed across this factor in all subsequent analyses. Although an ANOVA revealed significant differences between item–pair scores, $F(4, 424) = 4.21$, $p = .002$, these scores did not significantly interact with any other variable, suggesting that the pattern of performance that we report below was similar for all items.

Effects of Order, Age, and Condition on Task Performance

Perspective-taking scores ($N = 120$) were analyzed using a $2 \times 3 \times 2$ ANOVA with order (self-now trials first; self-now trials second), age (3; 4; 5), and condition (adult-now; self-future) as between-subjects factors. This analysis revealed a significant main effect of order, $F(1, 108) = 4.95$, $p = .028$, $\eta_p^2 = .04$, such that children who received the self-now trials first ($M = 0.75$, $SD = 0.37$, $n = 54$) scored higher on the adult-now or self-future trials than children who received the self-now trials second ($M = 0.57$, $SD = 0.41$, $n = 66$). There was also a significant main effect of age, $F(2, 108) = 13.35$, $p < .001$, $\eta_p^2 = .20$. Polynomial trend analyses revealed a significant linear trend, $p < .001$, such that mean perspective-taking scores increased with age: $M = 0.48$, $SD = 0.41$, $n = 43$; $M = 0.62$, $SD = 0.41$, $n = 43$; and $M = 0.90$, $SD = 0.23$, $n = 34$ for the 3-, 4-, and 5-year-olds, respectively. Finally, there was a significant main effect of condition, $F(1, 108) = 9.77$, $p = .002$, $\eta_p^2 = .08$, such that children in the adult-now condition ($M = 0.75$, $SD = 0.42$, $n = 66$) scored higher than those in the self-now condition ($M = 0.53$, $SD = 0.37$, $n = 54$).
the self-future condition \( (M = 0.54, SD = 0.43, n = 59) \). None of the interactions was significant: Order \( \times \) Age, \( F(2, 108) = 1.78, p = .174, \eta^2_p = .03 \); Order \( \times \) Condition, \( F(1, 108) = 0.15, p = .698, \eta^2_p = .001 \); Age \( \times \) Condition, \( F(2, 108) = 2.05, p = .134, \eta^2_p = .04 \); and Order \( \times \) Age \( \times \) Condition, \( F(2, 108) = 1.12, p = .331, \eta^2_p = .02 \).

**Chance Analyses**

Our main goals were to explore when children begin to understand that their future or grown-up preferences will differ from their current preferences, and to compare children’s ability to think about future preferences with their ability to think about the preferences of others (i.e., the effects of age and condition). Because order did not interact with either age or condition, we collapsed the data across order for these analyses and compared children’s perspective-taking scores to chance responding (i.e., a mean proportion score of 0.5) using the \( t \) distribution. We used a pooled error term derived from all of the Experiment 1 data and a Bonferroni correction for multiple comparisons \( (\alpha = .0083) \).

These tests, conducted separately for each age group, showed that in the self-future condition, 3-year-olds performed significantly below chance, \( M = 0.28, SD = 0.35, t(20) = -6.14, p < .001 \); 4-year-olds performed no different from chance (though trended in this direction), \( M = 0.57, SD = 0.43, t(21) = 1.97, p = .063 \); and 5-year-olds performed significantly above chance, \( M = 0.84, SD = 0.28, t(15) = 9.39, p < .001 \). In contrast, in the adult-now condition, all age groups performed significantly better than chance: \( M = 0.68, SD = 0.37, t(21) = 4.86, p < .001 \); \( M = 0.67, SD = 0.38, t(20) = 4.75, p < .001 \); and \( M = 0.94, SD = 0.18, t(17) = 12.04, p < .001 \), for the 3-, 4-, and 5-year-olds, respectively (see Figure 1).

**Discussion**

Our results show that children’s capacity to consider their own future preferences as well as the preferences of an adult improve significantly between ages 3 and 5. In addition, children were significantly better at acknowledging that their own current preferences diverge from those of an adult than they were at acknowledging that their own current preferences will diverge from their adult ones. Furthermore, the results from our chance analyses suggest that only 5-year-olds consistently acknowledged a divergence in preferences between their “current” and “future” selves. That is, 5-year-olds appeared to recognize that although they currently preferred Kool-Aid to coffee, for example, this preference is subject to change once they are all grown up. In contrast, at age 3, children were consistently defaulting to their current preferences when asked what they will prefer as adults, as evidenced by their significantly below-chance performance. At age 4, children were responding at chance, which may signal a transitional stage of development whereby they are no longer defaulting to their current preferences, but cannot yet acknowledge that these will differ from their future ones.

Because all age groups performed above chance in the adult-now condition (and significantly better than in the self-future condition), we can dismiss the possibility that children had difficulty reasoning about their own future preferences because they lacked the knowledge about what adults prefer. Otherwise, children should have performed similarly in the adult-now and self-future conditions. Why, then, is taking the perspective of one’s grown-up self difficult for young children and also more difficult than taking the perspective of a grown-up?

One possibility centers on the type of “perspective shift” that children must make when thinking about the future self. More specifically, to acknowledge that one’s current preferences may differ from one’s future preferences, it is crucial to make what we might term an “intrapersonal temporal” perspective shift. In contrast, in the adult-now condition, children need only make an “interpersonal” perspective shift, with no temporal quality attached to it. Although our data suggest that a temporal...
shift (i.e., recognizing that present and future preferences differ) is more difficult for children than a “person” shift (i.e., recognizing that self and other preferences differ), it may be that what children find particularly challenging is thinking about the future self. More specifically, children may have difficulty acknowledging that what they, themselves, prefer right now is subject to change in the future, rather than having a global difficulty thinking about the future (or future preferences), per se. If so, then children should perform better in a condition in which they are asked to reason about another child’s future preferences as these do not directly pertain to the self. However, if thinking about the future, more generally, is difficult for young children then performance should not vary when thinking about their own, versus another child’s, future because both require acknowledging the fact that current and future preferences may differ. The goal of Experiment 2 was to distinguish between these two possibilities.

Experiment 2

As in Experiment 1, one group of children was asked to reason about the perspective of their future selves (self-future condition) and another group was asked to reason about the perspective of a grown-up (adult-now condition). We also asked a third group of children to reason about another child’s future perspective and thus to identify what a same-aged peer would prefer when he or she is “all grown up” (peer-future condition). We only included 3- and 4-year-olds given that the performance of the 5-year-olds in Experiment 1 was nearly at ceiling.

Participants

Ninety-six English-speaking children: forty-eight 3-year-olds (23 boys; \(M_{\text{age}} = 42 \text{ months, age range} = 36-47 \text{ months} \)) and forty-eight 4-year-olds (24 boys; \(M_{\text{age}} = 53 \text{ months, age range} = 48-59 \text{ months} \)) participated. Participant characteristics and recruitment methods were the same as in Experiment 1.

Procedure

Children were randomly assigned to either the adult-now condition, self-future condition, or peer-future condition. Children in the peer-future condition were asked to reason about the future preferences of a same-aged peer (peer-future trials) and the current preferences of this same-aged peer (peer-now trials). As in Experiment 1, the adult-now condition included adult-now trials and self-now trials, whereas the self-future condition included self-future trials and self-now trials.

Task instructions were similar to those in Experiment 1. One difference was that children were first shown an instant photograph of themselves during the introduction of the self-now trials (adult-now and self-future conditions) or a photograph of a same-aged, sex-matched peer during the introduction of the peer-now trials (peer-future condition). For example, children were shown a photograph of Sally/Billy and were told: “Here’s a picture of Sally/Billy. I’m going to show you some things and I want you to tell me what Sally/Billy likes best right now.” Photographs (of self or peer) were then removed prior to the actual start of the self-now or peer-now trials.

As in Experiment 1, children were shown a photograph of a sex-matched adult (i.e., Jane/John) when introducing the adult-now trials, self-future trials, and peer-future trials. In addition, and unlike in Experiment 1, children were simultaneously shown a picture of themselves (self-future trials) or the same-aged, sex-matched peer (peer-future trials). Using the peer-future trials as an example, children were shown both photographs (i.e., same-aged peer and adult) and told:

Here is a picture of Jane/John. Jane/John is a grown-up woman/man. She/He is as big as your mommy/daddy. Here is a picture of Sally/Billy. One day, Sally/Billy is going to be all grown up. She’ll/He’ll be as big as Jane/John. I’m going to show you some things and I want you to tell me what Sally/Billy will like best when she’s/he’s all grown up.

Children were then asked: “Which one of these will Sally/Billy like best when she/he is all grown-up?” Instructions for the self-future trials were identical, save that “you” was substituted for “Sally/Billy.” Unlike in Experiment 1, in which the photograph of the adult remained in view during the presentation of each trial, in Experiment 2, the photograph of the adult (as well as the child/peer) was taken away so as to prevent children from potentially matching “adult” items to the photograph of the adult, rather than actually reasoning about adult/grown-up preferences.
We used the same 5 trials as in Experiment 1 plus 1 additional trial in which children were asked to select between a school bag (child item) and a wallet (adult item). As in Experiment 1, children either received the baseline trials (i.e., 6 self-now trials in the adult-now and self-future conditions and 6 peer-now trials in the peer-future condition) before or after the 6 grown-up trials (12 trials total in each condition). The order of presentation and placement of the adult- and child-preferable items was randomized for each of the 12 trials.

**Scoring**

As in Experiment 1, children’s choice on any given adult-now or self-future or peer-future trial was only included in the analysis if the child-preferable item was chosen on the corresponding self-now or peer-now trial. Once again, the majority of children (77% of 3-year-olds and 85% of 4-year-olds) chose 4, 5, or 6 of the child items on the self-now or peer-now trials with only a minority (23% and 15% of 3- and 4-year-olds, respectively) choosing 0, 1, 2, or 3. There were five children who chose adult items for either themselves or their peer on each of the six trials and thus their data were necessarily excluded from all analyses. Scores on the perspective-taking task were calculated by dividing the resulting proportion score ranging from 0 to 1.

**Preliminary Analyses**

One-way ANOVAs revealed that age differences between conditions were not significant—3-year-olds: $M = 42.63$, $SD = 4.46$; $M = 43.29$, $SD = 3.20$; and $M = 40.40$, $SD = 3.18$, $F(2, 45) = 2.68$, $p = .080$; 4-year-olds: $M = 53.71$, $SD = 3.33$; $M = 53.25$, $SD = 3.38$; and $M = 52.87$, $SD = 3.94$, $F(2, 45) = 0.23$, $p = .800$— for the adult-now, self-future, and peer-future conditions, respectively. In addition, an ANOVA revealed no significant main effect of sex or significant interactions of sex with any other variable on perspective-taking scores and so the data were collapsed across this factor in all subsequent analyses. Finally, an ANOVA revealed that item–pair scores did not differ significantly, $F(5, 410) = 2.04$, $p = .072$, nor did they interact with any other variable of interest.

**Effects of Order, Age, and Condition on Task Performance**

Perspective-taking scores ($N = 91$) were analyzed using a $2 \times 2 \times 3$ ANOVA with order (baseline trials first; baseline trials second), age (3; 4), and condition (adult-now; self-future; peer-future) as between-subjects factors. As in Experiment 1, this analysis revealed a significant main effect of order, $F(1, 79) = 6.53$, $p = .013$, $\eta^2_p = .08$, such that children who received the baseline trials first ($M = 0.65$, $SD = 0.33$, $n = 48$) scored higher on the target trials than children who received the baseline trials second ($M = 0.47$, $SD = 0.41$, $n = 43$). There was also a significant main effect of age, $F(1, 79) = 5.30$, $p = .024$, $\eta^2_p = .06$, such that 3-year-olds ($M = 0.49$, $SD = 0.37$, $n = 45$) scored lower than 4-year-olds ($M = 0.64$, $SD = 0.37$, $n = 46$), and a significant main effect of condition, $F(2, 79) = 3.50$, $p = .035$, $\eta^2_p = .08$. Follow-up Tukey comparisons revealed that children in the adult-now ($M = 0.63$, $SD = 0.36$, $n = 33$) and peer-future conditions ($M = 0.66$, $SD = 0.39$, $n = 25$) performed better than children in the self-future condition ($M = 0.43$, $SD = 0.37$, $n = 33$), $p < .05$ and .037, respectively. The difference in mean perspective-taking scores between the adult-now and peer-future conditions was not statistically significant. Finally, none of the interactions was significant: Order $\times$ Age, $F(1, 79) = 1.18$, $p = .280$, $\eta^2_p = .02$; Order $\times$ Condition, $F(2, 79) = 0.23$, $p = .798$, $\eta^2_p = .01$; Age $\times$ Condition, $F(2, 79) = 2.07$, $p = .133$, $\eta^2_p = .05$; and Order $\times$ Age $\times$ Condition, $F(2, 79) = 1.88$, $p = .160$, $\eta^2_p = .05$.

**Chance Analyses**

As in Experiment 1, we collapsed across order to compare children’s perspective-taking scores to chance responding (i.e., a mean proportion score of 0.5). We used the pooled error term derived from all Experiment 2 data and a Bonferroni correction for multiple comparisons ($\alpha = .0083$).

Using the $t$ distribution we conducted separate tests for each age group within condition. As in Experiment 1, 3- and 4-year-olds performed significantly better than chance in the adult-now condition: $M = 0.63$, $SD = 0.35$, $t(15) = 3.34$, $p < .004$, and $M = 0.64$, $SD = 0.37$, $t(16) = 3.39$, $p < .004$, respectively. In the self-future condition, 3-year-olds performed significantly below chance, $M = 0.36$, $SD = 0.34$, $t(16) = -3.42$, $p = .004$, while 4-year-olds performed no different from chance, $M = 0.50$, $SD = 0.40$, $t(15) = -0.08$, $p = .939$, also replicating
the results from Experiment 1. Finally, in the peer-future condition, 3-year-olds performed no different from chance, $M = 0.48, SD = 0.41, t(11) = -0.63, p = .543$, while 4-year-olds performed significantly above chance, $M = 0.83, SD = 0.28, t(12) = 8.39, p < .001$ (see Figure 2).

**Discussion**

The results of Experiment 2 suggest that children’s understanding of an adult’s preferences, their own future preferences, and the future preferences of a same-aged peer all improve significantly between ages 3 and 4. In addition, consistent with the results of Experiment 1, 3- and 4-year-olds were better at acknowledging that their current preferences diverge from those of an adult than they were at acknowledging that their current preferences diverge from those of their own future selves ($p = .050$). However, our results also indicated that children were significantly better at reasoning about a peer’s future preferences than they were at reasoning about their own future preferences. This finding suggests that children’s difficulty in reasoning about their own future preferences is not simply due to a global deficit thinking about the future but, rather, is partly due to the specific appreciation that one’s own preferences will change in the future. We discuss this finding in more detail in the General Discussion.

**Experiment 3**

Although the results of Experiment 2 largely replicate those of Experiment 1, we ran one final experiment with 5-year-olds to conclusively pinpoint the age at which children succeed at identifying the preferences of a grown-up, their own grown-up selves, and the grown-up selves of another child.

**Method**

**Participants**

Twenty-four English-speaking 5-year-olds (12 boys; $M_{age} = 67$ months, age range = 60–71 months) participated. Participant characteristics and recruitment methods were the same as in Experiments 1 and 2.

**Procedure**

The procedure was identical to that used in Experiment 2.

**Scoring**

Scoring for this experiment was conducted in the same way as it was in Experiments 1 and 2. Once again, the majority of children (94%) chose 4, 5, or 6 of the child items on the self-now or peer-now trials with only one of the 5-year-olds having chosen 3.

**Results**

A preliminary ANOVA revealed no significant main effect of sex or significant interactions of sex with any other variable on perspective-taking scores and so the data were collapsed across this factor in all subsequent analyses. Although an ANOVA revealed significant differences between item–pair scores, $F(5, 90) = 2.35, p = .047$, these scores did not significantly interact with any other variable, suggesting that the pattern of performance that we report below was similar for all items.

Perspective-taking scores ($N = 24$) were analyzed using a $2 \times 3$ ANOVA with order (baseline trials first; baseline trials second) and condition (adult-now; self-future; peer-future) as between-subjects factors. This analysis revealed a significant main effect of order, $F(1, 18) = 4.48, p = .048$, $n_p^2 = .20$, such that children who received the baseline trials first ($M = 0.99, SD = 0.05, n = 12$) scored higher on the grown-up trials than children who received the baseline trials second ($M = 0.83, SD = 0.22, n = 12$). Neither the main effect of condition, $F(2, 18) = 0.15, p = .863$, nor the
Order x Condition interaction, $F(2, 18) = 0.15$, $p = .863$, was statistically significant.

As in previous experiments, we compared children’s perspective-taking scores to chance responding (i.e., a mean proportion score of 0.5) within each condition using the $t$ distribution (pooled error term, Bonferroni correction: $z = .0167$). These tests showed that 5-year-olds performed significantly above chance in each condition—$M = 0.90$, $SD = 0.23$, $t(7) = 10.95$, $p < .001$; $M = 0.90$, $SD = 0.18$, $t(7) = 10.95$, $p < .001$; and $M = 0.94$, $SD = 0.12$, $t(7) = 12.10$, $p < .001$—for the adult-now, self-future, and peer-future conditions, respectively.

**Discussion**

Our results show that by age 5, children are competent at reasoning about the preferences of a grown-up, their own grown-up selves, and the grown-up selves of a same-aged peer.

**General Discussion**

In three experiments we explored preschoolers’ understanding that their current preferences are subject to change and, specifically, may differ from those they will hold in the future. We also compared this understanding to children’s understanding that others’ preferences differ from their own, and that another child’s future preferences may differ from that child’s current preferences. Our results indicate that children’s ability to think about these different perspectives significantly improves with age. In addition, children have significantly more difficulty accurately predicting their own future preferences (e.g., that, as adults, they will prefer coffee to Kool-Aid) than they do predicting either the current preferences of an adult (Experiments 1 and 2) or the future preferences of a peer (3- and 4-year-olds in Experiment 2). Experiment 3 also showed that it is only by 5 years of age that children were significantly above chance in the adult-now, self-future, and peer-future conditions. In contrast, 3-year-olds’ performance was only above chance in the adult-now condition, whereas the 4-year-olds’ performance was above chance in both the adult-now and peer-future conditions.

**Implications for Research on Future Thinking**

Although recent research has revealed marked development in children’s ability to talk about the future (e.g., Atance & Meltzoff, 2005; Busby & Suddendorf, 2005) and choose an item or tool to solve a future problem (e.g., Suddendorf et al., 2011), our experiments are the first to explore preschoolers’ understanding that their future or grown-up preferences may differ from their current ones. The fact that this ability also develops significantly between ages 3 and 5 further contributes to a unified picture of improvement across various domains of young children’s future-oriented cognition. Yet our findings also extend upon this research by suggesting a possible developmental trajectory through which children progress when contemplating future preferences.

Specifically, the results of our chance analyses show that at age 3, children have difficulty thinking about both their own personal future and the future of another child. As such, one could describe this age group as having a more global deficit in contemplating the future, a characterization that is consistent with previous research. However, at age 4, children are competent at appreciating that another child’s grown-up preferences may differ from that child’s current ones, but have difficulty applying this understanding to the self. A similar finding was reported by Russell et al. (2010) who found that 4-year-olds were better at selecting necessary items for a game of “blow football” the next day when asked to choose for another child than when asked to choose for themselves. This “self-other” difference signals a potentially important phenomenon in the development of future thinking ability and, specifically, that in some instances it may be easier for children to think about another child’s future than it is for them to think about their own. Why might this be the case?

**Episodic Versus Semantic Distinction**

One factor that may serve to explain the difference between the self-future and peer-future conditions is their potentially different reliance on mental time travel and, specifically, the ability to mentally project the self into the future to pre-experience an event (Suddendorf & Corballis, 1997, 2007). It has been argued that this capacity differs from general knowledge about the past and future (i.e., semantic memory and semantic future thinking; Atance & O’Neill, 2001; Tulving, 2005) and, in fact, emerges later in development than its semantic counterpart (e.g., Tulving, 2005). Thus, it may be that reasoning about one’s own future preferences draws both on the episodic system—in this case, mentally traveling in time to think about one’s future self (e.g., “when
I’m all grown up, I’ll like coffee”) and the semantic system (e.g., the knowledge that adults like coffee), whereas reasoning about both an adult’s preferences and the future preferences of another child draw mainly on the semantic system. If so, then the extra step involved in the reasoning process (i.e., envisioning the self in the future, or drawing on the episodic system) might account for why children’s performance in Experiment 2 was significantly better in the peer-future condition than it was in the self-future condition.

More specifically, it is possible that when children are asked to take the perspective of another person they adopt a semantic or knowledge-based (i.e., what another person ought to do) reasoning mode that leads to a correct response. In contrast, when making decisions that pertain to the self, the reasoning mode is also episodic. In addition, it is arguable that when the “mental projection” into the future pertains to the self (as opposed to other), this projection is especially difficult because it is contaminated by the self’s current beliefs, desires, or preferences. As such, it is possible that improvements both in episodic thinking and inhibition interact to lead to task success. This could be tested in future experiments in which tasks in each of these domains are administered alongside our perspective-taking task.

Such an account may also help to explain the self–other difference reported by Russell et al. (2010). As noted, these authors found that 4-year-olds were better at selecting necessary items for a future game of blow football (at a spatial location where they had not yet played) when asked to choose for another child than when asked to choose for themselves. Russell et al. interpret this difference as resulting from a growth error that involves overapplying newly developed Level 2 perspective-taking skills; that is, at age 4, children were so focused on the spatial perspective of playing the game of blow football that they failed to select the correct items needed to actually play the game. This account cannot explain our self–other difference given that our task does not involve a spatial element. However, we believe that our episodic versus semantic account may also serve to explain Russell et al.’s findings. Specifically, when children needed to select items to play the game in the future, their current desire for the appealing (but not future relevant) items hindered their capacity to think ahead. In contrast, when making a selection for the other child, the conflict between current and future desires was not as strong, thus allowing them to think ahead about what items the other child would need for the next day.

The Role of Experience

Another explanation for why an intratemporal perspective shift (i.e., self-future condition) is more difficult than either interpersonal (i.e., adult-now condition) or even interpersonal temporal (i.e., peer-future condition) shifts is that children have fewer opportunities to witness differences between their own changing perspectives over time (e.g., they preferred rattles as babies but now prefer Play-Doh) than between their own and another person’s perspective (e.g., they prefer Elmo but a friend or sibling prefers Big Bird, or their baby brother used to like drinking from a bottle but now insists on using a cup). “Future-perspective” shifts, in particular, may be especially challenging for children because they require reasoning about a point in time that children have not yet experienced, and that may not often be discussed with parents. As such, it is possible that “past-perspective” shifts (e.g., acknowledging that, as a baby, one preferred a rattle to Play-Doh) are easier because children may, at the very least, be able to draw on parents’ talk about the past (e.g., “when you were a baby you played with rattles”), or on their direct experiences with a younger sibling to make such judgments; a possibility that we are currently exploring.

Implications for ToM Research

As noted in the Introduction, ToM research (at least as it pertains to desire or preference understanding) has mostly focused on children’s ability to acknowledge differences between their own desires and those of another person (e.g., Atance et al., 2010; Cassidy et al., 2005; Flavell et al., 1968) or, at least in one study (i.e., Gopnik & Slaughter, 1991), differences between one’s own current and recent past desires. These situations can pose difficulties for young children and our results similarly show that children have difficulty acknowledging differences between their own current preferences and those that they may hold in the future.

In addition, one finding that was consistent in all three of our experiments is that children’s performance on our task was superior when they were given the opportunity to consider their own present perspective prior to considering an alternate one (e.g., that of an adult). Atance et al. (2010) report a very similar finding, namely, that children were better able to select an appropriate gift for their moms when they had the opportunity to select a gift for themselves first. This result was interpreted...
as evidence that having one’s own desire fulfilled freed up the necessary cognitive resources to consider the desire of another person. We would take this a step further to argue that merely considering one’s own current perspective first may help the child to then acknowledge that someone else (or the self at a different point in time) may hold a contrasting perspective. This finding should be explored further and in different contexts because it has relevance for the kinds of manipulations that may improve children’s perspective-taking ability.

Finally, and more broadly, our results are interesting in light of the different predictions that various accounts of ToM development (though mostly pertaining to an understanding of false belief) make about children’s self–other reasoning. For example, by a theory–theory account (e.g., Gopnik & Wellman, 1992), children are argued to reason similarly about self and other because they uniformly apply their theory about how the mind works across both of these contexts. By contrast, other theories (e.g., simulation theory) are more in line with the possibility that children will understand mental states in self before other. Finally, in recent accounts stemming from brain imaging findings (e.g., Buckner & Carroll, 2007), the argument is that several different forms of perspective taking, including thinking about others and about one’s own future self, rely on the same common brain network and thus these two capacities should emerge around the same time. Yet, in contrast to all of these accounts, our data show that, at least with respect to reasoning about future states or preferences, children may first need to understand that they can hold perspectives that differ from those of another person before they can understand that their own perspectives may differ over time.

**Limitations**

We chose to study the specific capacity to consider future or grown-up preferences. It may be that a different pattern of findings would have been obtained had we asked children to consider future knowledge or belief states—especially since these tend to be less affective. We also suspect that asking children about different future points in time (e.g., “next year,” “later in childhood,” etc.) would provide a broader picture of children’s reasoning about future preferences, as would varying the desirability of the items in question. For example, one challenge of understanding that our current and future preferences will differ may lie in children having to imagine a shift from liking “desirable” (e.g., Kool-Aid) to “undesirable” (e.g., coffee) things. If so, then manipulating the extent to which the child or adult item is considered desirable to children is predicted to impact performance on our perspective-taking task.

A related point is the subtle difference between children thinking that it is possible versus probable that their grown-up preferences will differ from their current ones. Our paradigm tapped into the latter, which is arguably more difficult than the former. One could adapt our method to tap into the former by presenting children with a rating scale consisting of unhappy, neutral, and happy faces and asking them to point to the face that best corresponds to how much they will like Kool-Aid and coffee when they are all grown up. This would allow for a more fine-grained or continuous (vs. categorical) analysis of children’s understanding of the changing nature of preferences.

Developing adequate continuous measures for children would be challenging but doing so would allow for a more direct comparison between our data and data from adults. That is, in studies testing adults’ predictions about future emotions or preferences (e.g., Quoidbach et al., 2013), researchers use continuous measures (e.g., rating scales) to assess the extent to which people predict that their preferences will change, rather than the dichotomous measure that we used in the current study. Using such continuous measures allows for the detection of a significant bias in adults’ future predictions but this does not mean that their predictions are fully inaccurate. Similarly, although the 5-year-olds’ predictions about their future selves were practically at ceiling in our study (and hence, “accurate”), this does not mean that they would show less bias than adults on more continuous measures assessing future preference predictions.

**Conclusions**

Our results provide a timely contribution to an understudied aspect of young children’s cognitive development: the ability to reason about one’s future self and one’s own future preferences, in particular. We have shown that this skill develops substantially between ages 3 and 5, and that it is more difficult than contemplating the future preferences of a peer. Although we suggested potential hypotheses to explain this finding, additional studies are needed to further identify how the mechanisms that underlie thinking about one’s own future may differ from those that underlie thinking about the future of another person. In addition to this issue being of strong theoretical interest, we believe that its applied
value is equally great. For example, were it to be found that children sometimes think more accurately about the future when they consider another person’s perspective rather than their own, this could form the basis of interventions to improve the future-oriented decision making of children and adults alike.

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