

Preschoolers' Understanding of Others' Desires: Fulfilling Mine Enhances My Understanding of Yours

Cristina M. Atance and Michèle Bélanger
University of Ottawa

Andrew N. Meltzoff
University of Washington

We developed a gift-giving task requiring children to identify their mother's desire, when her desire differed from theirs. We found a developmental change: 3- and 4-year-olds performed more poorly than 5-year-olds (Experiment 1). A modified version of this task (Experiment 2) revealed that 3-, 4-, and 5-year-olds whose desires had been fulfilled chose an appropriate gift for their mothers significantly more often than children whose desires were unfulfilled. Children who merely anticipated desire fulfillment also outperformed children whose desires were unfulfilled. Analysis of children's verbal explanations provides converging evidence that desire fulfillment enhanced children's tendency to adopt the perspective of their mother and justify their choices by referencing her desires. Discussion focuses on why desire fulfillment enhances children's ability to consider the desires of others.

Keywords: perspective taking, theory of mind, desire, future, explanations

Understanding that others' desires may differ from our own is an important aspect of social cognition. For example, a person's recognition that her love of tofu, country music, and rare books is not shared by everyone should lead her to carefully consider what food to serve at a dinner party, what music to bring on a road trip, and what gift to buy a friend. Arguably, those individuals who make choices that take into account the desires of others will be viewed as more socially adept than those who fail to do so. When do children begin to appreciate that others' perspectives—their desires in particular—may differ from their own?

Early research on conceptual perspective-taking (e.g., Flavell, Botkin, Fry, Wright, & Jarvis, 1968; Zahn-Waxler, Radke-Yarrow, & Brady-Smith, 1977) examined children's ability to select an appropriate gift for another person when the gift that the children desired differed from what the other person desired. For example, in Flavell et al. (1968), children were presented with gift choices that were desirable to them (e.g., doll, truck), along with ones that were desirable to their parents (e.g., silk stockings, necktie). When asked to select gifts for their parents, nearly all of the 3-year-olds chose ones that they themselves desired (doll, truck), whereas older children were increasingly able to choose ones that their

parents would desire. Gopnik and Seager (cited in Astington & Gopnik, 1991) found a similar developmental increase in children's reasoning about desires. They presented children with two books—a child's book and an adult's book. Children were then asked which one they would choose to read and which one an adult male who was present would choose. Whereas nearly all of 5-year-olds correctly chose the adult book for the adult male, about two thirds of the 4-year-olds and less than half of the 3-year-olds chose correctly.

Other recent research using different methods is also consistent with the idea that young children have special difficulty appreciating that others' desires may differ from, or conflict with, their own. For example, Moore et al. (1995) found that 3- and 4-year-olds were often unable to grasp that whereas they preferred a highly desirable cat sticker, another character, who had suffered an unpleasant experience with a cat, would prefer the less desirable flag sticker. On the basis of these and other data, Cassidy et al. (2005) concluded that 3-year-olds have difficulty identifying another person's desire when the following two conditions are met: (a) The other person's desire conflicts with the child's, and (b) the child must infer the other's desire based on this person's past experience. When neither or only one of these conditions obtains, 3-year-olds are proficient at reasoning about others' desires, as was demonstrated by Cassidy et al. (see also Bartsch & Wellman, 1989; Wellman & Woolley, 1990). It has been argued that even 18-month-olds can take into account the differences in food preferences between self and other when these can be gleaned from the other person's emotional expression (Repacholi & Gopnik, 1997).

Cassidy et al.'s (2005) analysis of children's desire-based reasoning provides a good explanation of the errors that young preschoolers made on the perspective-taking tasks of Flavell et al. (1968) and Zahn-Waxler et al. (1977). By its very nature, gift-giving requires that we infer what someone else desires, and it often requires that we select a gift that is different from or conflicts with what we ourselves desire. As such, taking another person's perspective in the context of gift-giving is not trivial and may be

This article was published Online First August 2, 2010.

Cristina M. Atance and Michèle Bélanger, School of Psychology, University of Ottawa, Ottawa, Ontario, Canada; Andrew N. Meltzoff, Institute for Learning and Brain Sciences, University of Washington.

We are grateful for financial support from a Discovery Grant from the Natural Sciences and Engineering Research Council of Canada to Cristina M. Atance and a National Science Foundation Science of Learning Center Grant (OMA-0835854) to Andrew N. Meltzoff. We thank Anisha Varghese for assistance with the coding of the data and the children and the parents who volunteered their time to participate in this study.

Correspondence concerning this article should be addressed to Cristina M. Atance, School of Psychology, University of Ottawa, 200 Lees Avenue, Room E228, Ottawa, Ontario, Canada, K1N 6N5. E-mail: atance@uottawa.ca

especially difficult for 3- and possibly 4-year-olds. However, we propose that there are other significant reasons in addition to “inference + conflict” that make gift-giving (and other contexts like it) challenging for young children.

An inherent feature of the existing accounts of children’s difficulty with conflicting desires is that children are biased by their own desires. That is, their strong desire for the item in question makes it difficult to consider the desire of another. It is important to point out that adults, too, are influenced by their own thoughts, preferences, and desires when making judgments about others (e.g., Gilovich, 1990; Van Boven & Loewenstein, 2003). For example, Gilovich (1990) found that people who prefer 1960s music to 1980s music think their preference is more common than a preference for 1980s music.

A similar bias is presumably also operative when adults engage in activities, such as gift-giving, that require adopting another’s perspective. Imagine that you are shopping for a friend’s birthday gift. You spot a terrific fondue set that you are sure she will love and immediately purchase it. It is likely that this choice (and others like it) was biased in the direction of your own desire. However, an intriguing question is whether your choice would have differed if you had bought the fondue set for yourself (thus satisfying your own desire) and then chosen for your friend. If you have what you want, can you more readily think about what others want—even when the object of their desire differs from the object of your own? To our knowledge, this question has not been empirically addressed. Yet, from an intuitive standpoint, it seems plausible that children and adults alike are better at considering the desires of others once their own desires have been fulfilled. Having one’s own needs met may free up the cognitive resources necessary to consider someone else’s.

We addressed this possibility by first developing a gift-giving task in Experiment 1 that required children to identify another’s desire when this desire differed from their own. We then used a modified version of this task in Experiment 2 to test whether fulfilling children’s desires would help them to better consider the desire (and perspective) of another. It is important to note that this desire fulfillment manipulation still requires children to infer that another person desires something that conflicts with what they desire—the very conditions that, it is argued, make desire-based reasoning difficult for young children. If our manipulation improves children’s performance, it suggests that the current theoretical explanation of inference + conflict for children’s limitations in desire-based reasoning is underspecified and that children’s own desire fulfillment plays an important role in the mechanisms underlying their judgments about others’ desires, with implications for the perspective-taking and theory-of-mind literatures.

Experiment 1

The gift-giving task that we developed was similar to Flavell et al.’s (1968), but we reduced the number of exemplars such that only one child-desirable item and one adult-desirable item were presented. We hoped that this modification would make the task even more straightforward for the children, thus providing a clear index of their ability to understand that another’s desire can differ from their own.

Method

Participants. Participants included 60 English-speaking preschoolers: 20 three-year-olds ($M = 41.50$ months, range = 36–46; 12 boys), 20 four-year-olds ($M = 54.25$ months, range = 48–59; 10 boys), and 20 five-year-olds ($M = 65.75$ months, range = 61–71; 10 boys). Of the participants, 31 were White, six were Asian, and four were Other (an additional 19 parents did not report their child’s race or ethnicity). Participants had mixed social backgrounds ranging from lower working-class families to upper middle-class families and were recruited in Ottawa, Canada, and surrounding areas. Methods of recruitment included advertisements published in local newspapers and parent magazines, as well as posted in local community centers, coffee shops, and daycare centers. Formal information about language(s) spoken in the home was not collected for these studies. Parents received parking reimbursement and children received a toy for their participation.

Procedure and materials. Children were tested individually in a laboratory setting by a female experimenter while the parent or guardian watched through a one-way mirror in an adjoining room. All sessions were video-recorded. The gift-giving task included a self trial and a Mom trial. For the self trial, children were asked to indicate their preference between a small stuffed animal (a pink Care Bear for girls and a green frog for boys) and a copy of *Canadian Living* magazine: “Which one of these do you like best: This magazine or this bear [frog]?” For the Mom trial, children were asked: “Which one of these do you think would be a good present for your Mom: this magazine or this bear [frog]?” The two trials, the order in which the objects were named (stuffed toy first vs. magazine first), and their position on the table (child’s left vs. child’s right) were counterbalanced across participants. The gift-giving task was always preceded by an unrelated task not discussed here.

Dependent measure. Each child received a score of 1 for correctly choosing the magazine on the Mom trial and a score of 0 for incorrectly choosing the stuffed toy. Similarly, children received a score of 1 for choosing the stuffed toy on the self trial and a score of 0 for choosing the magazine. For both trials, children could either point or verbally label their choice. Children’s item choices were coded from the video-recording by an undergraduate psychology student who was unaware of the goals or hypotheses of this experiment.

Results and Discussion

Preliminary analyses revealed no effects of sex of participant, order in which the objects were named, or left/right placement for children’s choices. There was also no effect of trial order: When children were asked about their own preference first, 74% chose correctly on the Mom trial, and when children were asked about Mom’s preference first, 62% chose correctly on the Mom trial ($p = .35$). The data were therefore collapsed across these factors in the subsequent analyses.

Mom trial: Developmental analysis. We first tested whether children’s selection of a magazine for their mothers differed significantly as a function of age. To determine whether this choice was the result of children taking Mom’s perspective (and not their own), it was necessary that children identify that they themselves preferred the stuffed toy. Thus, only data from children who

selected a stuffed toy on the self trial ($n = 56$) were included in the subsequent analyses (two 3-year-old boys and one 5-year-old boy selected a magazine on the self trial, and one 5-year-old boy refused to make a selection). Chi-square analysis revealed that the pattern of performance (incorrect, correct) differed significantly as a function of age (3, 4, 5), $\chi^2(2, N = 56) = 9.13, p < .05$, Cramer's $\theta = .40$ (see Table 1). Five-year-olds chose an appropriate gift for their mothers more often than either 3-year-olds (Fisher's exact test, $p < .05$),¹ or 4-year-olds, $\chi^2(1, N = 38) = 9.10, p < .01$, Cramer's $\theta = .50$. The 4-year-olds' performance did not differ from that of the 3-year-olds. In addition, binomial tests showed that only the 5-year-olds chose the magazine for Mom more often than would be expected by chance ($p < .001$), whereas the performance of the 3- and 4-year-olds did not differ from chance ($p = .48$ and $p = 1.0$, for the 3- and 4-year-olds, respectively). Thus, although the 3- and 4-year-olds in this experiment did not consistently fail the task, only by age 5 did nearly all children pass. This is despite the fact that the 5-year-olds also preferred the stuffed animal.

These findings are consistent with previous research on children's desire reasoning (e.g., Cassidy et al., 2005; Flavell et al., 1968) and show that even a simplified task with low verbal demands is nevertheless surprisingly difficult for young preschoolers. Nonetheless, it is possible that the poorer performance of the younger children may have been partly due to their limited knowledge of the types of items that adults desire, rather than failures of perspective-taking per se. Experiment 2 addresses this possibility, while also extending the findings in other ways that are informative for theory.

Experiment 2

The goals of Experiment 2 were to (a) use a modified version of our gift-giving task to determine whether children whose desires have been fulfilled are better able to reason about the desires of their mothers, (b) obtain children's verbal explanations for their gift selections, and (c) determine whether selecting a gift for their mothers is difficult for young children because they lack the necessary knowledge that particular items are typically associated with adults. The children who did not select the magazine for Mom in Experiment 1 may have understood that someone can desire something that is different from what they desire but failed due to knowledge limitations (children in the studies by Flavell et al., 1968, and Zahn-Waxler et al., 1977, may have also experienced this difficulty).

To address the first goal, we modified the gift-giving task so that children were now asked to choose both a gift for themselves and

a gift for their mothers and to place the chosen gifts into a shopping basket. Asking children to select a gift for themselves may provide a better reflection of their reasoning about desires than asking them to indicate their preference (which was the method that we used in Experiment 1). Indeed, as Cassidy et al. (2005) have argued, "the custom of gift-giving is based on the idea of figuring out what a person wants without that person directly indicating what they want" (p. 435). More importantly, this methodological change allowed us to address whether fulfilling children's desires by having them choose the gift that they wanted would lead to an increased ability to consider their mother's desire. We are aware of the nuanced philosophical difference between the terms *desire* and *preference*; however, we chose to use the former term in the context of our work because of its use in past literature when describing tasks similar to ours (e.g., Flavell et al., 1968; Repacholi & Gopnik, 1997) and because one can speak of fulfilling a desire but not of fulfilling a preference.

Children were randomly assigned to one of three experimental conditions. In the unfulfilled desire condition, children selected a gift (stuffed teddy bear or magazine) for Mom first—thus, before their own desire was fulfilled. In contrast, in the fulfilled desire condition they did the reverse and chose for self first, thus fulfilling their own desire before considering Mom's. We also included an "anticipated desire" condition in which children selected a gift for Mom first but, prior to making this choice, were told that they would be selecting a gift for themselves afterwards. This condition controlled for the possibility that children in the fulfilled desire condition may perform better because the Mom trial is second and also tested the theoretically interesting possibility that cognitively anticipating desire fulfillment in the future also enhances performance. We predicted that the fulfilled desire condition would be easier than the unfulfilled desire condition; however, we remained agnostic about whether merely anticipating desire fulfillment (i.e., anticipated desire condition) would also help children reason about another's desire.

We addressed our second goal by asking children immediately after they had selected for themselves and for their mothers to explain their choices. Explanation data have been shown to provide important information about children's reasoning (e.g., Wellman & Lagattuta, 2004; Wellman & Liu, 2007). We hypothesized that children who made the appropriate choice for their mothers would justify this choice by referring to her desires (e.g., "because Mom likes magazines"), whereas children who did not make the appropriate choice for their mothers would appeal to their own desires (e.g., "because I like teddy bears") when asked to explain their choice.

We addressed our third goal by developing a new sorting task that was administered to all children after the gift-giving task. This task assessed whether preschoolers are knowledgeable about everyday items typically associated with Moms and everyday items typically associated with children. We reasoned that if children succeeded on this task, yet chose the incorrect gift for Mom, then their difficulty is best characterized as perspectival rather than knowledge-based.

Table 1
Experiment 1: Performance on the Mom Trial as a Function of Age

Age group	Gift selection	
	Stuffed animal (incorrect)	Magazine (correct)
3-year-olds	7	11
4-year-olds	10	10
5-year-olds	1	17

¹ Fisher's exact test was run because two cells had expected frequencies less than 5.

Method

Participants. Participants included 80 English-speaking preschoolers: 32 three-year-olds ($M = 41.88$ months, range = 37–47; 14 boys), 24 four-year-olds ($M = 54.04$ months, range = 48–59; 12 boys), and 24 five-year-olds ($M = 64.54$ months, range = 60–71; 12 boys). Sixty-two of these children participated at our research laboratory, and 18 participated in their daycare programs. Four additional children were excluded from the final sample because of experimenter error. Of the participants who visited the laboratory, 39 were White, four were Asian, four were Black, and six were Other (nine parents did not provide information about their child's race or ethnicity). We were unable to obtain information about race or ethnicity of the daycare participants. Children had similar social backgrounds, were recruited in the same city using the same methods, and were compensated in the same way as in Experiment 1.

Procedure and materials. All children were tested individually by a female experimenter. The laboratory participants were tested in a laboratory playroom while parents or guardians watched through a one-way mirror in an adjoining room; the daycare participants were tested in a closed-off area of their daycare. The children first received the gift-giving task, followed by the sorting task (described below). All sessions were video recorded.

Gift-giving task. This task consisted of two trials, a self trial and a Mom trial. All children were given a shopping basket and told that they were going to be shopping for presents. Specific instructions then varied as a function of experimental condition. In the unfulfilled desire condition, children were told: "In this game, you're going to shop for a present for Mom." In the fulfilled desire condition, children were told: "In this game, you're going to shop for a present for you, and then you're going to shop for a present for Mom. So, you're going to get to choose two presents: First you have to choose a present for you and next you have to choose one for Mom." Finally, in the anticipated desire condition, children were told: "In this game, you're going to shop for a present for Mom, and then you're going to shop for a present for you. So, you're going to get to choose two presents: First you have to choose a present for Mom and next you have to choose one for you." The experimenter then placed four copies of the same edition of *Canadian Living* magazine and four small brown plush teddy bears on the table in front of the children: "Look, we have teddy bears and magazines." We presented children with four copies of each item rather than one copy, as was the case in Experiment 1, to ensure that children's choices for either self or Mom were not influenced by item availability. The order in which the items were named and their position on the table (i.e., to the child's left or right) were counterbalanced across participants.

In the fulfilled desire and anticipated desire conditions, children were asked two memory control questions to confirm that they had understood whom they would be shopping for, and in which order: "Okay, so who do you have to choose a present for first?" and "Okay, so who do you have to choose a present for next?" If the children answered both questions correctly, the experimenter proceeded with the first trial. If the children answered either of the questions incorrectly, the experimenter repeated the instructions and asked the check questions again. The experimenter repeated the instructions a maximum of two times. Only three children were unable to answer the check questions after this second repetition.

Their data were excluded from analyses for this reason and also because none of them scored at least 8/10 on the sorting task (see below).

For all three conditions, the experimenter then proceeded with each of the two trials: the Mom trial and the self trial in their respective orders according to condition. The Mom trial was as follows: "Which one of these do you think would be a good present for your Mom: one of these bears or one of these magazines?" For the self trial, children were asked: "Which one of these do you think would be a good present for you: one of these bears or one of these magazines?" The order in which the items were asked about was counterbalanced.

After each trial, children placed their selected gift in their shopping basket. They were then asked the following verbal explanation question: "How come you chose the bear [magazine]?" Prior to the second trial, the experimenter restocked the item to prevent children from basing their choices on which item there was more or less of. In addition, to prevent children's second choice from being influenced by the item they had just chosen, the experimenter momentarily removed it from the basket and placed it under the testing table, while telling children, "I'm just going to put this away for now."

Sorting task. The new sorting task was introduced as a matching game. Each participant was presented with two red plastic sorting bins and was told the following: "This one has a picture of a Mom (picture of an adult female) on it and this one has a picture of a girl [boy] (picture of a girl [boy] matched to the child's sex) just like you on it." The order in which the bins were named and their position on the table (i.e., to the child's left or right) were counterbalanced across participants. Next, the child was shown a third grey plastic bin containing 12 items to be sorted (i.e., two demonstration items and 10 test items).

Six items typically associated with female adults (purse, pens, sewing kit, postage stamps, tea bags, and paperback book) and six items typically associated with children (school bag, crayons, Play-Doh, animal stickers, package of Kool-Aid, and small stuffed giraffe) were presented. These items were selected on the basis of whether they could be matched with another item to form pairs of one adult item and one child item from the same category (e.g., crayons and pens, for writing instruments; note that the giraffe-and-book pair was included to provide a close match to the stuffed-bear-and-magazine pair used in the gift-giving task).

The children were then given the following instructions: "I am going to show you two things at a time, and I want you to put the Mom thing in the Mom bin and the kid thing in the kid bin, just like this." The experimenter demonstrated the task using the purse and the schoolbag, after which the test trials began. For the test trials, the experimenter named the two items and asked children to sort each of them into a bin. Items were presented to the children in a random order.

At the end of the session, children were thanked for their participation and were given the gift item they had chosen for themselves (bear or magazine) to bring home with them.

Dependent measures. Each child received a score of 1 for correctly choosing the magazine on the Mom trial and a score of 0 for incorrectly choosing the bear. Each child received a score of 1 for choosing the bear on the self trial and a score of 0 for choosing the magazine. For both trials, children could either point to or verbally label their choice. Children's item choices were

coded from the video recordings by an undergraduate psychology student who was unaware of the goals or hypotheses of this experiment.

Although we asked children to explain their choices for both the self and Mom trials, only those associated with the Mom trial were coded, because these were of theoretical interest. Children's explanations were coded as follows: (a) self perspective (e.g., "I want it," "I like it"; note that this category also included references to the object itself, e.g., "it's nice" or "it's so cute"); (b) Mom perspective (e.g., "Mom will like it," "Mom reads while watching television"; note that this category also included several generic responses of the following type: "magazines are for grown-ups"); (c) no or irrelevant response (e.g., "I don't know," "I gotta put it here"). Children's explanations were first transcribed from the video recordings by the second author and then independently coded from the transcripts by the first and second authors. At no point during the coding did the scorers have access to the child's actual performance on the Mom trial. Agreement between scorers was high (Cohen's $\kappa = .95$). Disagreements were resolved through discussion.

For the sorting measure, children received a score of 1 for each correct item sort and a score of 0 for each incorrect item sort, resulting in a total score ranging from 0 to 10. Children's item sorts were coded from the video recordings by an undergraduate psychology student who was unaware of the goals or hypotheses of this experiment.

Results and Discussion

Sorting task. We report results from the sorting task first, because only children who scored 8 or above on this task were included in the subsequent analyses. We reasoned that scoring below this cutoff might indicate confusion about the types of items typically associated with children and with adults and thus would preclude a fair assessment of children's abilities on the gift-giving task. The scores of the 80 children in the sample were as follows: four children scored 5 on the sorting task (all 3-year-olds), four children scored 6 (all 3-year-olds), nine children scored 8 (five 3-year-olds and three 4-year-olds), and three children scored 9 (two 3-year-olds and one 4-year-old). The remaining 60 children all scored a perfect 10 (17 three-year-olds, 20 four-year-olds, and 24 five-year-olds). Thus, only eight children scored lower than the cutoff score of 8; as a result, a total of 72 children were included in all subsequent analyses.

Gift-giving task. Preliminary analyses revealed no effects of sex of participant, order in which the objects were named, left/right placement, or testing location (i.e., laboratory vs. daycare) on children's choices for Mom or self, so the data were collapsed across these factors.

Mom trial: Developmental analyses. Recall that children's selection for Mom was scored as correct if the magazine was chosen and incorrect if the bear was chosen. As in Experiment 1, to ensure that children's choice of a magazine was a result of taking their mothers' perspective (as opposed to their own), only children who chose the bear in the self trial ($n = 68$) were included in these analyses (one 3-year-old girl, two 4-year-old girls, and one 5-year-old boy selected a magazine on the self trial). Chi-square analysis revealed that the pattern of performance (incorrect, correct) differed significantly as a function of age (3, 4, 5), $\chi^2(2, N =$

$68) = 9.42, p < .01$, Cramer's $\theta = .37$ (see Table 2). Both 4- and 5-year-olds selected an appropriate gift for their mothers more often than 3-year-olds, $\chi^2(1, N = 45) = 5.35, p < .05$, Cramer's $\theta = .35$, and $\chi^2(1, N = 46) = 7.56, p < .01$, Cramer's $\theta = .41$, respectively. The performance of the 4- and 5-year-olds did not differ significantly. In addition, binomial tests showed that only the 4- and 5-year-olds selected a magazine for their mothers significantly more often than would be expected by chance ($p < .05$, and $p < .01$, respectively); the performance of the 3-year-olds did not differ from chance ($p = .68$). Thus, whereas the developmental shift in performance in Experiment 1 occurred between ages 4 and 5, it occurred between ages 3 and 4 in the current experiment—which differed procedurally from the first. Inspection of the data suggests that this difference is due to the crucial experimental treatment (both the fulfilled and anticipated desire conditions) particularly benefitting the 4-year-olds. Indeed, the 4-year-olds' data pattern for the unfulfilled desire condition in Experiment 2 (three incorrect responses, four correct responses) is not appreciably different from the pattern obtained in Experiment 1 (10 incorrect responses, 10 correct responses).

Mom trial: Condition analyses. Additional chi-square tests revealed that the pattern of performance (incorrect, correct) differed significantly as a function of condition (unfulfilled desire, anticipated desire, fulfilled desire), $\chi^2(2, N = 68) = 7.34, p < .05$, Cramer's $\theta = .33$ (see Table 2). Both the fulfilled desire and anticipated desire conditions were easier than the unfulfilled desire condition, $\chi^2(1, N = 46) = 5.60, p < .05$, Cramer's $\theta = .35$, and $\chi^2(1, N = 44) = 4.70, p < .05$, Cramer's $\theta = .33$, respectively. Performance in the fulfilled desire and anticipated desire conditions did not differ significantly. Subsequent binomial tests revealed that only in the fulfilled desire and anticipated desire conditions did children select the magazine more often than would be expected by chance ($p < .01$ and $p < .05$), respectively.

Explanations. We excluded no or irrelevant response explanations ($n = 8$) and conducted a chi-square examining whether the type of explanation children provided (self perspective, Mom perspective) differed as a function of performance (incorrect, correct). This analysis was highly significant, $\chi^2(1, N = 60) = 17.93, p < .001$, Cramer's $\theta = .55$, and the data are presented in descriptive form in Table 3. We also examined whether children's

Table 2
Experiment 2: Gift Selection on the Mom Trial as a Function of Age and Condition

Age group and condition	Gift selection	
	Bear (incorrect)	Magazine (correct)
3-year-olds		
Unfulfilled desire	7	1
Anticipated desire	3	4
Fulfilled desire	3	5
4-year-olds		
Unfulfilled desire	3	4
Anticipated desire	1	6
Fulfilled desire	1	7
5-year-olds		
Unfulfilled desire	2	5
Anticipated desire	1	7
Fulfilled desire	1	7

Table 3
Experiment 2: Children's Explanations as a Function of Their Scores on the Mom Trial

Type of explanation	Gift selection	
	Stuffed animal (incorrect)	Magazine (correct)
Self perspective	13	4
Mom perspective	8	35

explanations differed as a function of condition (fulfilled desire, anticipated desire, unfulfilled desire). This analysis was also significant, $\chi^2(2, N = 60) = 9.23, p < .05$, Cramer's $\theta = .39$ (see Table 4). This means that our manipulation not only affected children's choices but also their verbal explanations for their choices and, specifically, the perspective (self or Mom) that they adopted when explaining their choices.

Results of Experiment 2 support the claim that children find it easier to consider another's desire when their own desires have been fulfilled. Fulfilling children's desires (fulfilled desire condition) or merely informing children that their desires would be fulfilled (anticipated desire condition) seemed to be equally beneficial to children's performance—a point to which we return in the General Discussion. In addition, children's verbal explanations indicated that the majority of the children who correctly chose for Mom were adopting her perspective, whereas the majority of the children who chose incorrectly were adopting their own perspective, which provides valuable new data about children's reasoning on these types of tasks. Finally, the fact that only children who performed well on the sorting task were included in our analyses suggests that failure on the gift-giving task was not the result of a lack of knowledge about items typically associated with Mom. Note too that we reanalyzed the data using only the 57 children who scored perfectly on the sorting task and who also chose a bear on the self trial. The pattern of results reported above on all dependent measures remains essentially unchanged; importantly, the effect of condition on children's scores on the Mom trial remains significant, $\chi^2(2, N = 57) = 10.76, p < .01$.

General Discussion

These experiments show that important development in children's reasoning about others' desires occurs during the preschool years. Whereas 3-year-olds had significant difficulty identifying their mothers' desires in the context of our gift-giving task, 4-year-olds and, to a greater extent, 5-year-olds had much less difficulty. These findings are consistent with existing literature about the limitations that characterize young preschoolers' reasoning about desires that differ from their own. More importantly, our findings reveal that children's capacity to reason about others' desires is significantly enhanced when their own desires have been fulfilled or are anticipated to be fulfilled. Specifically, children in our study were better at recognizing that their mothers would desire a magazine more than a stuffed bear when children either had the bear in hand or were told that they would be receiving it, compared with when they had to choose for Mom with their desire unfulfilled. Our data analyzing children's explanations extend this finding by

showing that in the fulfilled desire and anticipated desire conditions, children tended to also verbally reference their mothers' perspective when asked why they had selected the magazine.

Extending Existing Theories About Preschoolers' Desire Reasoning

One argument for children's difficulty on conflicting desire tasks lies in failures of inhibition. For example, Moore et al. (1995) argued that children have difficulty inhibiting their own desire to consider another person's. The notion of inhibition is important to consider in relation to our task but needs qualification in light of our data. By an inhibition account, the hardest condition in Experiment 2 should have been the unfulfilled desire condition, because children needed to reason about their mother's desire when their own had not been satisfied. In contrast, the easiest condition should have been the fulfilled desire condition. Although children's desires still conflicted with their mother's, inhibitory demands were arguably lower because children had received their desired gift, thus freeing up the cognitive resources necessary to consider their mother's perspective. Although one could argue that in this condition, children's desire no longer conflicted with their mother's because they had their gift in hand, this interpretation does not provide a full explanation, because children performed no differently in the anticipated desire condition in which children did not physically possess their gift. From an inhibitory control standpoint, children's performance on the anticipated desire condition should have been lower than on the fulfilled desire condition but higher than on the unfulfilled desire condition. This is because children's desire was only fulfilled in the psychological sense, which would arguably make the inhibitory demands of the anticipated desire condition midway between those of the unfulfilled and fulfilled desire conditions.

Our data do indeed support the prediction that the unfulfilled desire condition was the most difficult for the children. However, they do not support the idea that the fulfilled desire condition was easier than the anticipated desire condition; rather, there was no difference in performance between these two conditions. This finding suggests that failures of inhibition cannot be the sole factor influencing children's performance.

Cassidy et al. (2005) proposed that one factor that might lie at the heart of the inference + conflict difficulty that characterizes children's desire reasoning is an inability to imagine that another object, activity, etc., really could be desirable. Again, several aspects of our data suggest that such an inability does not fully characterize children's difficulty on our task. At the most basic level, we directly addressed the possibility that children fail certain

Table 4
Experiment 2: Children's Explanations as a Function of Condition

Condition	Explanation	
	Self perspective	Mom perspective
Unfulfilled desire	11	10
Anticipated desire	3	15
Fulfilled desire	3	18

types of conflicting desire tasks (including ours) because they lack the requisite knowledge about the types of objects that others might find desirable. This would be the case if, for example, a young child tended to view adults as being associated with kid items (e.g., sticker books and crayons), rather than with adult items (e.g., paperback books and pens).

We attempted to rule out this possibility by introducing a sorting task that required children to place adult items in one bin and kid items in another. Results of this task revealed that children were quite adept at doing so. Moreover, only children who showed a high level of proficiency on this task (8/10 items correct) were included in the analyses. As such, it seems reasonable to conclude that even young children have the requisite knowledge that would allow them to make the inference that a magazine would be more desirable to Mom than a stuffed bear. More convincing is the fact that children in the fulfilled desire and anticipated desire conditions showed a significant increase in imagining that the magazine would be desirable to their mothers. This implies that children do indeed possess the requisite knowledge for making the correct choice in the gift-giving task and suggests that they have at least a partial understanding of the subjective nature of desires. Why, then, is it easier for children (and possibly adults) to reason about others' desires when their own desires have been fulfilled?

Mechanisms of How Desire Fulfillment Influences Understanding Others' Desires

We advance the following hypothesis: Having an unfulfilled desire results in an intense cognitive focus on this desire and how it can be met or fulfilled. However, once the desire is fulfilled, cognitive resources are freed up, thus allowing a shift from contemplating one's own perspective to contemplating another person's. That is, when children's preoccupation or attention to their own desire is alleviated—as occurs in the fulfilled desire condition—they are in a better position to reason about a desire that conflicts with their own. What is striking is that merely anticipating desire fulfillment seems to have much the same effect as actual desire fulfillment. Conversely, in a situation in which one's desire is unfulfilled, it is more difficult to contemplate someone else's perspective. As demonstrated by our data, 5-year-olds can make this shift regardless of whether or not their desires have been fulfilled. In contrast, younger children (most notably 3-year-olds) are significantly aided in making this shift when their own desires have been fulfilled.

This line of reasoning is consistent with theories by social psychologists such as Baumeister (e.g., Baumeister, Heatherton, & Tice, 1994; Baumeister, Vohs, & Tice, 2007) who view self-control as dependent on a limited energy resource. Their claim is supported by research showing that when people must complete multiple tasks that require self-control, performance deteriorates over time. Although children in our study were not required to make multiple choices that involved reasoning about another's conflicting desire, it is possible that having to control their own desire while making a choice for Mom taxed their self-control—especially so for the younger children. By this argument, any manipulation that succeeds in fulfilling children's desires should result in an increased ability to consider another person's desire, even when this desire conflicts with what the child desires.

A related way of interpreting the findings is to use the distinction that has been drawn between “hot” and “cool” executive function (EF; e.g., Hongwanishkul, Happaney, Lee, & Zelazo, 2005). Whereas it is argued that cool EF is elicited by abstract, decontextualized problems, hot EF may be elicited by problems that involve the regulation of affect and motivation, or affective decision-making. A prototypical cool EF task is one that measures working memory, whereas a prototypical hot EF task is one that measures delay of gratification (though it is important to recognize that, as of yet, no one task has been identified as a pure measure of hot or cool EF; see also Metcalfe & Mischel, 1999, for related ideas about hot and cool systems of self-control).

Whereas Hongwanishkul et al. (2005) do not directly address the issue of developmental primacy with respect to hot and cool EF, Metcalfe and Mischel (1999) argue that early in development, children's attempts at willpower are more likely to fail because their behavior is largely under control of the hot system. With age, the cool system develops, thus accounting for increases in self-control (e.g., children's performance on delay of gratification tasks improves). Situational factors can also influence a shift from hot-system to cool-system control. Children perform better in a delay of gratification task if they “cognitively transform” the reward by imagining the pretzels, for example, as long, thin logs, rather than crunchy, tasty treats (Mischel & Baker, 1975). Similarly, Carlson, Davis, and Leach (2005) found that children performed better on an executive function task when symbolic substitutes were used to represent the rewards.

Although this is speculative, it is possible that either having one's own desire fulfilled or knowing that it will be fulfilled helps transform an otherwise hot task into a cool one. With respect to the fulfilled desire condition, once children have made the choice that pertains to the self, the affective component of the task decreases and the choice that they make for their mother is less contaminated by their own desire. Consistent with the notion of cognitive transformation, the anticipated desire condition may have led children to imagine themselves receiving the reward (i.e., bear), resulting in a cool-down that then allowed them to consider their mother's perspective. Thus, rather than using their imaginations to transform the reward from hot to cold (e.g., Carlson et al., 2005; Mischel & Baker, 1975), children may have used their imaginations to transform the situation (e.g., “I don't have a bear right now, but I will be receiving one”).

The Power of Anticipation

An intriguing aspect of our results is that children in Experiment 2 did not perform differently in the fulfilled desire condition, compared with the anticipated desire condition. One way to characterize the fulfilled desire condition is that children's desire was fulfilled in a physical sense. In contrast, in the anticipated desire condition, children's desire was only fulfilled in the psychological sense. That is, children did not possess the bear when they made the choice for Mom but were aware that they would be receiving it. Yet, children seemed to benefit by merely being told that they would get to choose a gift for themselves (and hence have their desire fulfilled).

This is impressive, because it suggests that they were able to process and hold in mind a future situation in which they would

receive a bear. As such, this finding adds to a growing body of literature which shows that children's ability to anticipate future states of the self (e.g., Atance & Meltzoff, 2005), imagine what they will be doing the next day (e.g., Busby & Suddendorf, 2005), and even make important connections between past and future events (Lagattuta, 2007), are developing during the preschool years. An interesting prediction stemming from this interpretation is that the performance of a younger group of children (e.g., 2-year-olds) would not increase in the anticipated desire condition, because of a limited ability to consider the self in future time. An interesting question is whether 2-year-olds' performance would significantly increase in the fulfilled desire condition (matching what we found with older children) or whether their performance cannot be boosted in the case of conflicting or divergent desires, even with the manipulation of self-fulfillment.

Children's Explanations

The verbal explanation data we obtained are especially informative for theories. The results show that our desire fulfillment manipulation yielded a significant increase in explanations that included reference to Mom's perspective (as opposed to the child's own). Children could have merely stated "I don't know" or provided an irrelevant response to our explanation question. The fact that they did not suggests that the effect of our manipulation went beyond modifying their behavioral choices to changing the perspective that they adopted when making their choice. Moreover, our data on children's explanations shed light on how children begin to make inferences about another person's desires when these desires are not explicitly stated (as was the case in our gift-giving task). Of the ten 3-year-olds who chose correctly in Experiment 2, none explained their choice by stating that Mom liked to read, for example, or by drawing on a past experience of seeing Mom look at and enjoy a magazine (hence, leading to her desire for a magazine rather than a bear). However, by ages 4 and 5, 18% and 47% of children's explanations, respectively, made reference to such causes (e.g., "I think she likes reading magazines when it's the afternoon"). These findings are consistent with the proposal that, with age, children gain more opportunities to witness what other people like (and dislike) and can then draw on these experiences for future reference (e.g., Meltzoff, Gopnik, & Repacholi, 1999).

Strengths and Limitations of Gift-Giving Tasks to Assess Children's Desire Reasoning

We believe that our gift-giving task is an ecologically valid method of examining children's ability to consider another person's differing desires. In fact, several parents commented on the fact that they had noticed the same type of perspective-taking errors in their children that we observed in the current experiments. For example, one mother mentioned a prior instance of her child choosing a baby pool as a Father's Day gift. Another strength of this task is that although it requires children to infer a desire that conflicts with their own, it does not require lengthy verbal instructions about why a character may not like a certain object or event. For example, in studies by Cassidy et al. (2005) and Moore et al. (1995), children were told stories about same-age peers who,

because of a negative experience, developed an aversion to something that would traditionally be considered desirable (e.g., a big shiny sticker). As such, it is impossible to rule out that children's difficulty in these studies was partly due to the verbal and inferential demands of the tasks. In contrast, these demands do not characterize our task, because children were simply asked to choose what they believed would make a good gift for their mother. We argue that our gift-giving task, in combination with the additional control sorting task, is a valid and direct method of testing children's understanding that another person can desire something that differs from what they desire.

We recognize that our task only assessed children's desire reasoning in one particular context and about one particular other person (Mom). With respect to the former, an important issue to consider is whether children's ability to consider conflicting desires differs according to the content of the desire (e.g., toy vs. food) and context (e.g., who the choice is for). On the basis of arguments by Rozin (1996) and Siegal (1995), Cassidy et al. (2005) hypothesized that food may be a "privileged domain," thus leading children to reason more precociously about problems in this domain. Indeed, in a study by Repacholi and Gopnik (1997), 14- and 18-month-olds were randomly assigned to either a matched or a mismatched desire condition. In the matched condition, both the experimenter and the child shared the same preference for goldfish crackers and the same distaste for broccoli. In the mismatched condition, the experimenter expressed disgust after tasting the crackers and pleasure after tasting the broccoli. In both conditions, the dependent measure was whether, when given an ambiguous request for food by the Experimenter, the child gave her what she liked. Fourteen-month-olds failed but 18-month-olds reliably gave the experimenter the broccoli in the mismatched condition.

It is important to note that in this paradigm, children directly witnessed the experimenter's expression of disgust upon tasting the goldfish crackers, thus aiding the inferential process. Moreover, in light of our findings, one possibility is that Repacholi and Gopnik's (1997) task could be solved by young children because they made a choice for the experimenter after their own desire had been at least partially fulfilled. Specifically, prior to choosing for the experimenter children had been given the opportunity to taste the goldfish crackers. An intriguing question for future research is whether young children will perform differently if they are required to make the choice for the experimenter without having the opportunity to eat goldfish crackers prior to making the critical choice.

Finally, it is important to consider the effects of asking children about Mom as opposed to another adult or peer. Our logic for asking about Mom was that children are likely very familiar with their mothers' desires because, in most families, young children tend to spend more time with their mothers than with other family members. Thus, if anything, it would seem that having to reason about the conflicting desires of Dad, a sibling, or a peer would have been even more difficult in the gift-giving task that we presented to the children. Asking children to reason about other individuals and simultaneously measuring their familiarity and emotional attachment to that individual would be an important test of the generalizability of the findings we report.

Conclusion

Our results support the claim that children are better able to reason about others' desires when their own desires have been fulfilled or are anticipated to be fulfilled. Future research should aim to explore the mechanisms underlying this effect and whether the same effect is obtained when young children reason about different perspectives and different types of objects and events. Doing so would have implications for observed failures in perspective-taking in children and adults. For example, is it possible that children and adults alike would be more beneficent if their own desires were at least partially fulfilled? There are recent data from functional magnetic imaging concerning desire fulfillment (Cheng, Meltzoff, & Decety, 2007) and the neural bases of how similarities or differences between self and other influence perspective taking (Lamm, Meltzoff, & Decety, 2010).

In addition, it will be important to determine how children's performance on our task (both when their desires have and have not been fulfilled) is related to other developing aspects of theory of mind, such as false belief understanding and high-level visual perspective taking. There is ongoing debate about whether children come to understand the subjectivity of desires and visual perceptions before beliefs or whether such understanding is acquired all at the same time (e.g., Gopnik & Wellman, 1992; Moll & Meltzoff, in press; Moore et al., 1995; Rakoczy, Warneken, & Tomasello, 2007). The extent to which performance on our task is related to children's empathic understanding and reactions to others would also be a fruitful direction of research.

References

- Astington, J. W., & Gopnik, A. (1991). Developing understanding of desire and intention. In A. Whiten (Ed.), *Natural theories of mind: Evolution, development and simulation of everyday mindreading* (pp. 39–50). Cambridge, MA: Blackwell.
- Atance, C. M., & Meltzoff, A. N. (2005). My future self: Young children's ability to anticipate and explain future states. *Cognitive Development, 20*, 341–361.
- Bartsch, K., & Wellman, H. M. (1989). Young children's attribution of action to beliefs and desires. *Child Development, 60*, 946–964.
- Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.
- Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science, 16*, 351–355.
- Busby, J., & Suddendorf, T. (2005). Recalling yesterday and predicting tomorrow. *Cognitive Development, 20*, 362–372.
- Carlson, S. M., Davis, A. C., & Leach, J. G. (2005). Less is more: Executive function and symbolic representation in preschool children. *Psychological Science, 16*, 609–616.
- Cassidy, K. W., Cosetti, M., Jones, R., Kelton, E., Rafal, V. M., Richman, L., & Stanhaus, H. (2005). Preschool children's understanding of conflicting desires. *Journal of Cognition and Development, 6*, 427–454.
- Cheng, Y., Meltzoff, A. N., & Decety, J. (2007). Motivation modulates the activity of the human mirror-neuron system. *Cerebral Cortex, 17*, 1979–1986.
- Flavell, J. H., Botkin, P. T., Fry, C. L., Wright, J. W., & Jarvis, P. E. (1968). *The development of role-taking and communication skills in children*. New York, NY: Wiley.
- Gilovich, T. (1990). Differential construal and the false consensus effect. *Journal of Personality and Social Psychology, 59*, 623–634.
- Gopnik, A., & Wellman, H. M. (1992). Why the child's theory of mind really is a theory. *Mind and Language, 7*, 145–171.
- Hongwanishkul, D., Happaney, K. R., Lee, W. S. C., & Zelazo, P. D. (2005). Assessment of hot and cool executive function in young children: Age-related changes and individual differences. *Developmental Neuropsychology, 28*, 617–644.
- Lagattuta, K. H. (2007). Thinking about the future because of the past: Young children's knowledge about the causes of worry and preventative decisions. *Child Development, 78*, 1492–1509.
- Lamm, C., Meltzoff, A. N., & Decety, J. (2010). How do we empathize with someone who is not like us? A functional magnetic resonance imaging study. *Journal of Cognitive Neuroscience, 22*, 362–376.
- Meltzoff, A. N., Gopnik, A., & Repacholi, B. M. (1999). Toddlers' understanding of intentions, desires and emotions: Explorations of the dark ages. In P. D. Zelazo, J. W. Astington, & D. R. Olson (Eds.), *Developing theories of intention: Social understanding and self-control* (pp. 17–41). Mahwah, NJ: Erlbaum.
- Metcalfe, J., & Mischel, W. (1999). A hot/cool system analysis of delay of gratification: Dynamics of willpower. *Psychological Review, 106*, 3–19.
- Mischel, W., & Baker, N. (1975). Cognitive appraisals and transformations in delay behavior. *Journal of Personality and Social Psychology, 31*, 254–261.
- Moll, H., & Meltzoff, A. N. (in press). How does it look? Level 2 perspective-taking at 36 months of age. *Child Development*.
- Moore, C., Jarrold, C., Russell, J., Lumb, A., Sapp, F., & MacCallum, F. (1995). Conflicting desire and the child's theory of mind. *Cognitive Development, 10*, 467–482.
- Rakoczy, H., Warneken, F., & Tomasello, M. (2007). "This way!" "No! That way!"—3-year-olds know that two people can have mutually incompatible desires. *Cognitive Development, 22*, 47–68.
- Repacholi, B. M., & Gopnik, A. (1997). Early reasoning about desires: Evidence from 14- and 18-month-olds. *Developmental Psychology, 33*, 12–21.
- Rozin, P. (1996). Towards a psychology of food and eating: From motivation to module to marker, morality, meaning, and metaphor. *Current Directions in Psychological Science, 5*, 18–24.
- Siegal, M. (1995). Becoming mindful of food and conversation. *Current Directions in Psychological Science, 4*, 177–181.
- Van Boven, L., & Loewenstein, G. (2003). Social projection of transient drive states. *Personality and Social Psychology Bulletin, 29*, 1159–1168.
- Wellman, H. M., & Lagattuta, K. H. (2004). Theory of mind for learning and teaching: The nature and role of explanation. *Cognitive Development, 19*, 479–497.
- Wellman, H. M., & Liu, D. (2007). Causal reasoning as informed by the early development of explanations. In A. Gopnik & L. Schulz (Eds.), *Causal learning: Psychology, philosophy, computation* (pp. 261–279). New York, NY: Oxford University Press.
- Wellman, H. M., & Woolley, J. D. (1990). From simple desires to ordinary beliefs: The early development of everyday psychology. *Cognition, 35*, 245–275.
- Zahn-Waxler, C., Radke-Yarrow, M., & Brady-Smith, J. (1977). Perspective-taking and prosocial behavior. *Developmental Psychology, 13*, 87–88.

Received April 28, 2009

Revision received May 3, 2010

Accepted May 11, 2010 ■