

## Children Reason About Shared Preferences

Christine A. Fawcett and Lori Markson  
University of California, Berkeley

Two-year-old children's reasoning about the relation between their own and others' preferences was investigated across two studies. In Experiment 1, children first observed 2 actors display their individual preferences for various toys. Children were then asked to make inferences about new, visually inaccessible toys and books that were described as being the favorite of each actor, unfamiliar to each actor, or disliked by each actor. Children tended to select the favorite toys and books from the actor who shared their own preference but chose randomly when the new items were unfamiliar to or disliked by the two actors. Experiment 2 extended these findings, showing that children do not generalize a shared preference across unrelated categories of items. Taken together, the results suggest that young children readily recognize when another person holds a preference similar to their own and use that knowledge appropriately to achieve desired outcomes.

*Keywords:* theory of mind, cognitive development, social perception, social cognition, preferences

Effective social interaction requires an understanding that people are individuals with mental states such as intentions and desires, including an understanding that mental states often differ across individuals. Further, a crucial realization is that people are often consistent over time in mental states such as desires. This sort of consistency within an individual is often thought of within the framework of traits or dispositions (Trope & Higgins, 1993). Specifically, a preference is a type of disposition causing an individual to consistently value or desire one kind of thing over another. In contrast, a desire is a longing or wishing for something, which is a single, isolated mental state. For example, a desire to see a certain film will be fulfilled as soon as one has seen it. On the other hand, a preference for French films causes one to consistently want to watch French films over time and choose them over other types of films in many situations.

It is important to note that since traits and dispositions, such as preferences, are relatively consistent over time, they can be used to make inferences about others. These inferences may be particularly meaningful when two individuals share a preference. For example, one may be more willing to trust the recommendation of someone with whom they share a preference. Thus, an important consequence of the ability to recognize the preferences of others is that it fosters the detection of similarities and differences between one's own and another person's preferences, which can in turn affect how one thinks about and interacts with that individual. Do young children consider shared preferences in their interactions with others? In the current research, we investigated 2-year-old children's recognition of the correspondences between their own and others' preferences, and their use of such information in basic

social interactions. In two studies, we examined children's ability to first detect a shared preference and subsequently to apply that knowledge appropriately depending on its relevance to the task at hand.

To begin to answer the question of whether young children can recognize shared preferences, it is essential to first examine the requisite social-cognitive abilities needed for this task. The recognition of others' preferences requires the capacity to infer the mental states of others and keep track of consistencies within an individual over time. More specifically, children must be able to recognize emotional reactions directed intentionally toward specific objects or events and interpret them as a person's current desire, even if it conflicts with the child's own desire. They must also be able to keep track of consistencies in an individual's desires over time that might be indicative of dispositional aspects of personal preference. The ability to integrate such information is crucial if children are to recognize when another person's preference is similar to their own.

Infants as young as 12 months of age show recognition of others' desires in that they expect people to react positively to things they desire and to have the goal of obtaining these desired things (Phillips, Wellman & Spelke, 2002). As children's understanding of desire develops, they become increasingly capable of recognizing when others' desires differ from their own, an important skill for reasoning about the subjective nature of preferences. A decrease in egocentrism in desire understanding over the second year of life is evidenced by children's ability to distinguish their own from another's desire. Bronson (1981) found that between 12 and 24 months of age, toddlers increasingly offer toys and items on the basis of another person's desire or need. Further, in the latter part of the second year, children are able to distinguish their own desire from that of another person, offering the food item that an individual showed liking toward, even if it was not the food that the children themselves desired (Repacholi & Gopnik, 1997).

Understanding other people as individuals with characteristics and dispositions that are consistent over time is the second major component of the ability to reason about preferences. Since traits

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Christine A. Fawcett and Lori Markson, Department of Psychology, University of California, Berkeley.

Lori Markson is now at Washington University in St. Louis.

Correspondence concerning this article should be addressed to Christine A. Fawcett, who is now at Max Planck Institute for Psycholinguistics, Wundtlaan 1, PB 310, Nijmegen 6500 AH, The Netherlands. E-mail: christine.fawcett@mpi.nl

can be inferred from visible behaviors and are thought to be underlying causes of future behavior, adults often use traits and dispositions to explain and predict the behavior of others (Ross & Nisbett, 1991). The studies on desire understanding described thus far focused on behavior within a situation, rather than actions and desires that are consistent across situations and over time. One way that children might initially learn about dispositions and their predictive value is by observing consistencies in behavior within an individual over time and also differences in behavior across individuals.

Evidence for children's earliest understanding of individual dispositions comes from studies that examine their expectations regarding the movements of animated agents engaging in helping or hindering behaviors (Hamlin, Wynn, & Bloom, 2007; Kuhlmeier, Wynn, & Bloom, 2003; Premack & Premack, 1997). Twelve-month-old infants seem to perceive helping actions as consistent with other positively valenced behaviors, such as caressing (Premack & Premack, 1997) or approaching (Kuhlmeier et al., 2003). Even more impressive, 6- and 10-month-old infants have been shown to prefer individuals who have demonstrated helping behavior over an individual who has shown hindering behavior, as demonstrated by their reaching and looking behavior (Hamlin et al., 2007). In another study that examined the ability to recognize the dispositions of others, Song, Baillargeon, and Fisher (2005) found that 13-month-old infants expected that an actor whom they had observed sliding various toys back and forth would select a new toy that afforded the same sliding motion. These findings suggest that infants can attribute a disposition to another on the basis of their behavior in one situation and expect their new behaviors to reflect that disposition.

In contrast to the findings described earlier, Kalish (2002) found that preschoolers predicted complementary, rather than consistent, behaviors in characters, for example, that someone who chose to drink milk one time would later choose orange juice. Since this study described only one instance of the behavior for children before they had to make a prediction, it may not have tapped into children's understanding of dispositions or preferences. Children may need to be presented with multiple instances of some behavior or choice before they come to see it as something that will remain consistent over time. In fact, recent research has shown that while 5- and 6-year-old children may make inferences about others from a little as one instance of behavior, younger children require several instances of behavior before inferring a trait (Boseovski & Lee, 2006).

Do young children have a true understanding of traits and dispositions, or could simpler reasoning processes account for these findings? In many studies of children's disposition understanding, behavioral predictions can be based simply on consistency in actions over time, thus they may not require a true trait inference (e.g. Cain, Heyman, & Walker, 1997). However, Heyman and Gelman (2000) found that 3- to 5-year-old children preferentially used trait information over appearance information when matching characters' preferences and behaviors, suggesting that children at this age see traits as internal characteristics, not simply consistencies in behavior. In addition, as early as 5 years of age children make different predictions for a character's emotional reaction to a situation on the basis of the character's trait (Yuill & Pearson, 1998).

Another proposed alternative explanation for the findings on children's trait understanding is that they may simply rely on evaluative reasoning. That is, children may judge people as either positive or negative and make other inferences based on that valence (Ruble & Dweck, 1995). For example, 5- to 6-year-old children were found to rely primarily on valence of traits, not traits themselves, when making behavioral predictions about others (Alvarez, Ruble, & Bolger, 2001). It may be that children initially rely on valence as a general trait and only later build on that to incorporate more subtle trait understanding.

At what point can children integrate all of these cognitive skills to recognize the preference of another person as an underlying, consistent mental state and not simply behavioral consistency or general valence? From the described previously early abilities to understand others' emotions and desires as well as to recognize behavioral consistencies, it appears that 2-year-old children are likely capable of recognizing the preferences of others. That is, if young children are presented with an agent who consistently demonstrates a desire for a certain type of thing, they should interpret it as a preference and not just a series of desires for different things.

The ability to recognize a correspondence between one's own and another person's preferences is an essential component of learning to use social information to make sense of others' thoughts and actions. In the present experiments, we examined whether 2-year-old children recognize when another person's preference matches their own and how this information guides their actions. We incorporated into the experiments two methodological changes designed to facilitate children's understanding of consistent preferences and dispositions earlier than previously observed in similar studies (e.g., Kalish, 2002). First, the experiments were designed such that children played an active role in choosing between items, rather than being required to make explicit predictions about other people. Second, children were shown multiple instances of an individual's preference-indicating behavior. Thus, we predicted that children in the present study would demonstrate an understanding of consistent preferences and dispositions earlier than previously observed in similar studies. More specifically, we predicted that 2-year-old children would be able to integrate information from an interaction with another individual and recognize a possible shared preference between themselves and that person. Detecting a shared preference should, in turn, have influenced how children interpreted claims made by others about new items.

## Experiment 1

Do children form an impression of others' preferences upon observing multiple instances of an individual person's desires and actively use that knowledge to achieve their goals? In Experiment 1, we examined this issue by asking whether children are sensitive to two actors' contrasting toy preferences and use that knowledge to inform their own decisions about unseen items offered by those people. Specifically, if the child's own preference matches that of one of the actors and mismatches that of the other actor, will she choose to receive toys from the actor whose preferences are more consistent with her own?

In the present experiment, two actors introduce four pairs of fun and boring toys to a child, with one actor displaying a preference

for fun toys and the other displaying a preference for boring toys.<sup>1</sup> In one test condition, children are then asked to choose between new out-of-view items from the actors that are ostensibly each actor's favorite toy and book (favorite condition). If children detect the shared preference with the individual whose preference matched their own on the training trials and understand that this preference generalizes to other items in that category, then they should choose the favorite toy from the person who shared their toy preference. In addition, if children extend the shared toy preference to items in a related category, for example, books, they should also choose the favorite book from the person who shared their toy preference.

However, it is possible that children could form a positive association with the actor who shares their preference, leading children to choose items from her without requiring an understanding of shared preference. As a control to verify an understanding of preference, a second condition allows children to choose between toys and books that are unfamiliar to the actors (unfamiliar condition). Here, if children realize that the actors' preferences have no bearing on how desirable an item is if the actors do not know what the item is, they should not be biased to choose those items from the actor who shares their preference. In a third condition, children are asked to choose between items that the actors can see but claim to dislike (dislike condition). This condition focuses on children's understanding that they cannot simply base their decisions on the actors' knowledge of an item without attending to the content of the message that the individual is giving. If children understand this, then they should not choose items from the person who shares their preference when those items are disliked.

## Method

**Participants.** Participants were 144 children (65 girls, 79 boys) divided equally across the three conditions and two age groups, resulting in 24 children in each condition per age: 23-month-olds (mean age = 23 months 4 days; range = from 21 months 2 days to 25 months 24 days) and 28-month-olds (mean age = 28 months 17 days; range = from 25 months 26 days to 30 months 26 days). Participants were recruited from a database of families who expressed interest in participating in psychological research with their children. The majority of children tested were middle class and White ( $n = 86$ ), with the remainder of participants being Asian (29), Latino/a (22), or African American (7). Eighteen additional 23-month-old children were excluded from the analyses for refusal to complete the study (12), experimenter error (1), or failure to display a clear preference for either toy category during training, which precluded the development of a shared preference with either actor (5). Eleven additional 28-month-old children were excluded for refusal to complete the study (5), experimenter error (4), parental interference (1), or failure to display a clear preference for either toy category during training (1).

**Design.** The experiment included a training phase, in which children learned the toy preferences of two female actors, and a test phase, in which children could apply their knowledge of the actors' preferences to new items. During the initial training phase, two actors demonstrated their like and dislike for various toys, with one actor demonstrating an overall preference that matched that of the child (matching actor) and the other actor demonstrating

a preference that contrasted that of the child (mismatching actor). Children were then tested on how they applied their knowledge of the two actors' preferences to new toys (same category) and books (related category) on two test trials (one of each). Each child was randomly assigned to one of three possible test conditions—favorite, unfamiliar, or dislike—in which they were asked to choose between items offered by the two actors (in open bags—favorite and dislike conditions—or closed boxes—unfamiliar condition).

**Materials.** Four pairs of toys were included in the training portion of the experiment (see Figure 1). Each set was comprised of a fun, interesting toy and a plain, boring toy that were matched on at least one perceptual dimension (e.g. shape, material, category). Each fun toy was more colorful than its boring counterpart and in addition had an interesting function, such as having moveable parts or making a noise. For example, one of the fun toys was an orange and green baton with beads inside that made noise when it was turned, and its boring counterpart was a plain black plastic pipe. In the test trials of the favorite and dislike conditions, two identical toys (small yellow ducks) and two books were each enclosed inside a small opaque bag. The two test trial toys were chosen to be neutral (neither very fun nor boring) so that children did not receive strong positive or negative feedback for their choice. It is important to note that the plain yellow duck could be viewed as an item liked by either the matching or mismatching actor, since it was brightly colored yet did not have an interesting function. For the test trials of the unfamiliar condition, the same two identical toys were each enclosed inside a small opaque box, the two books were each concealed in an envelope, and each pair (of toys or books) was placed inside a large opaque bag, such that test items were not visible to the child or the two actors.

**Procedure.** There were two phases in the experiment: training and test.

**Training trials.** The child was seated across from two female actors. Parents sat in a chair behind the child and were asked to be silent throughout the procedure. The two actors demonstrated their opposite preferences during four training trials, such that one actor consistently showed a preference for fun toys and the other for boring toys. Each trial involved a pair of toys, including a more colorful and interesting toy (fun), which the matching actor claimed to like, and a more plain and boring toy (boring), which the mismatching actor claimed to like. To begin each of the four training trials, one actor removed the first toy in a pair from a large box placed on the floor between the two actors' chairs. The first actor commented on the toy using facial expressions and three statements about whether she liked or disliked the toy. For example, while showing very positive facial emotion, the actor would say in a happy, upbeat tone of voice, "Oh, what a nice toy. I really like this one. This is a great toy." In contrast, for the disliked toy, the actor would show a facial expression of dislike, saying in a low tone of voice, "I don't like this one very much. This isn't a fun toy. No, I don't like this one."

The first actor then handed the toy to the second actor who commented on it in the same manner but with the opposite reaction—that is, demonstrating liking for the toys the first actor

<sup>1</sup> Using a valence-based contrast of fun and boring toys was intended to make the difference between the actors' preferences salient for the children.



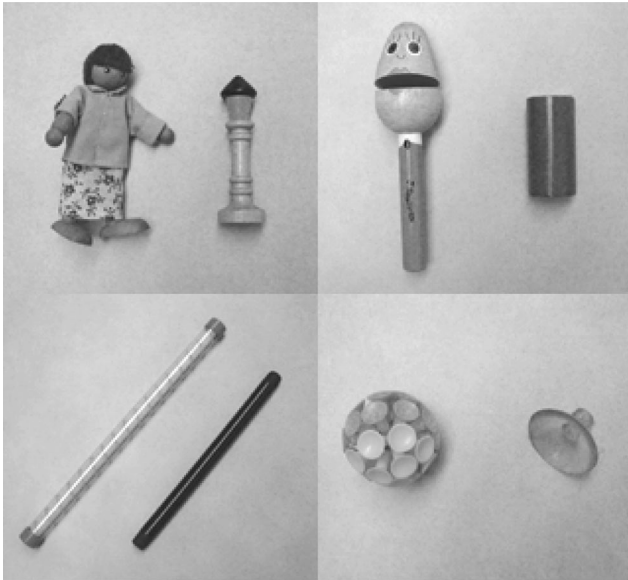


Figure 1. Pairs of fun toys (left side of each square) and boring toys (right side of each square) used in training children on actors' toy preferences.

disliked and dislike for the toys she liked. Next, the second actor took the second toy of the pair out of the box, commented on it, and gave it to the first actor who also commented on it. Actors then gave a final comment on which toy they liked and did not like, while taking hold of their liked toy. For example, "I don't like that one, but I like this one." Finally, each actor played with her favored toy for a few seconds, mirroring each other's actions on the toy (e.g., turning the baton or pipe back and forth in the air), before handing both toys to the child. The child was then allowed to explore the two toys briefly. The total amount of time each child played with the toys was based on the child's overall level of interest in the toys. When the actors judged that the child appeared to be satisfied with the toys, he or she was asked, "Would you like to see some more toys?" The actors then put the pair of toys away in order to begin the next trial.<sup>2</sup> Children's interest in each of the two toys during this play period was later coded by two independent coders in order to determine which toy in the pair each child preferred.

Trials were counterbalanced for which actor retrieved a toy from the box first. The order of presentation of the toy pairs was counterbalanced across children using a Latin square. In addition, the fun or boring toy preference role of each of the actors and whether each test question was asked by the actor with the fun or boring toy preference were counterbalanced across children.

**Test trials.** After the four training trials, there were two test trials, which followed the same basic format across the three conditions. In the favorite condition for the toy test question, each actor retrieved a small opaque bag and said, "My favorite toy from home is in here." Then the actors asked the child to choose a toy saying, "You can pick one of these toys to play with—my favorite toy [Actor 1], or my favorite toy [Actor 2]," while displaying a positive facial expression. After children chose a bag by pointing to it or touching it, the other bag was removed from the table, and children were allowed to retrieve the toy from inside and play with

it briefly. This was followed by a second test question, presented with the same basic procedure in which the two actors each took out a small opaque bag and said, "My favorite book from home is in here." Children were again asked to select a book in the same manner described in the toy question.

In the unfamiliar condition, each test question began when one actor retrieved a large bag and dumped out two small containers (boxes for the toys and envelopes for the books). For each test question, each actor picked up one of the small boxes/envelopes, saying "I think there's a toy/book in here, but I don't know what it is," with a puzzled expression on her face. As in the favorite condition, the actors asked children to choose one toy and book from each pair, saying, "You can choose one of these toys/books to play with—this one [Actor 1] or this one [Actor 2]."

In the dislike condition, the test question procedure was identical to the favorite condition except that each actor claimed to dislike the toy or book inside her bag, saying, "There's a toy/book in here, but I don't like it," while showing negative facial expressions and speaking in a low tone of voice. Again, the actors asked children to choose one toy and book from each pair, saying, "You can choose one of these toys/books to play with—this one, that I don't like [Actor 1], or this one, that I don't like [Actor 2]."

The toy trial always preceded the book trial, since the primary question of the experiment was whether children would recognize the shared toy preference between themselves and one of the actors and choose the favorite toy of that actor. An extension of that reasoning would be to choose a related item—a favorite book—from that person as well. Therefore, the toy question preceded the book question in order to check for children's performance within the category of toys prior to extending it to a different category.

**Coding.** Two independent coders rated children's preference for fun or boring toys while they played with the toys during the training trials. The coders determined preference by subjectively comparing the amount of time children interacted with and attended to each toy. A preference for the fun toy was scored as 1; a preference for the boring toy was scored as 0. If a child played equally with the two toys during a trial, it was interpreted as no preference for either the fun or boring toy and scored as 0.5. Coder agreement was initially 85% for children's toy preferences. All disagreements between the two coders were resolved by having the two coders discuss each disputed trial while viewing it together. Five of the 144 children showed an overall preference for the boring toys, and their test questions were coded so that choosing favorite items from the person who preferred boring toys was the correct answer. As noted earlier, children who showed no clear preference, that is, a score of 2 out of 4 (e.g., liking two fun toys and two boring toys), were excluded from subsequent analyses since they did not establish a clear shared preference with either actor. The first item (bag or envelope) a child touched was coded as his or her choice in each test trial, unless the child touched neither item, in which case the first item he or she pointed to was coded as the child's choice.

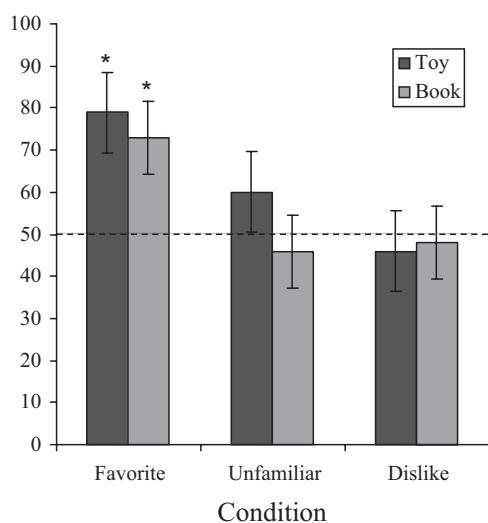
Two independent coders also rated the enthusiasm of the two actors to ensure the actors were equally positive about the toys they liked and equally negative about the toys they did not like,

<sup>2</sup> The average amount of play with each pair of toys was 45 s ( $SD = 22$  s) as coded from 25% of the participants' training trials.

regardless of whether their preference was for the fun or boring toys. Coders individually rated the actors' behavior on each trial as either equal in enthusiasm or rated one of the two actors as exhibiting greater enthusiasm than the other. If the two coders disagreed on a trial, they resolved the disagreement by discussion while viewing the trial together. Initial coder agreement was 98%, and after disagreements were resolved, the actors were found to have equal enthusiasm on 100% of the trials. Two independent coders also rated 25% of the test questions as to whether the intensity of actors' expressions of liking, unfamiliarity, and disliking were equal or unequal. Initial coder agreement was 89%, and actors were rated as having equal intensity of expressions on 93% of test questions after disagreements were resolved through discussion as described earlier.

## Results

The main question of interest was whether children would choose the favorite toy of the actor who shared their preference. As predicted, children selected the favorite toy of the matching actor (79%). This pattern of choices was not observed when the children were choosing unfamiliar (60%) or disliked (46%) toys (see Figure 2). A second question was whether children would extend their shared toy preference to a related category. Children tended to choose the favorite book of the matching actor (73%), suggesting that they did indeed make this generalization. Logistic regression was used to examine whether children's choices of items from the matching actor varied across the conditions and across the type of item. In the initial model, condition (favorite, unfamiliar, or dislike) and item (toy or book) were used to predict the likelihood of children choosing an item from the matching actor. This model revealed



*Figure 2.* Percentage of test trials on which children chose toys and books from the actor who demonstrated a shared toy preference with the child across the three conditions of Experiment 1. Children tended to choose items from the actor who preferred the same toys as the child when the items offered were the actors' favorite toys or books. However, children chose randomly when the items offered were unfamiliar or disliked by the actors. Dashed line indicates chance (50%); errors bars indicate standard error of the mean.

that children were more likely to choose items from the matching actor in the favorite condition than in either the unfamiliar condition ( $\beta = -1.04$ , Wald  $\chi^2 = 10.77$ ,  $p = .001$ ) or the dislike condition ( $\beta = -1.04$ , Wald  $\chi^2 = 10.77$ ,  $p = .001$ ). However, children were not more likely to choose toys than books from the matching actor ( $\beta = -0.34$ , Wald  $\chi^2 = 1.85$ ,  $p = .17$ ). A second model, which included the additional predictors of child gender and age group, revealed that the effect of condition held with the new predictors added (unfamiliar condition:  $\beta = -1.04$ , Wald  $\chi^2 = 10.79$ ,  $p = .001$ ; dislike condition:  $\beta = -1.05$ , Wald  $\chi^2 = 10.86$ ,  $p = .001$ ), and there were no significant effects for either item (toy or book) ( $\beta = -0.34$ , Wald  $\chi^2 = 1.86$ ,  $p = .17$ ), gender ( $\beta = 0.38$ , Wald  $\chi^2 = 0.02$ ,  $p = .88$ ), or age ( $\beta = 0.34$ , Wald  $\chi^2 = 1.80$ ,  $p = .18$ ).<sup>3</sup> To further examine children's choices across conditions, we performed binomial tests to compare the mean choices in each condition to chance (see Figure 2). In the favorite condition, children chose toys and books from the matching actor significantly more often than expected by chance (binomial  $p < .001$ ). However, in the unfamiliar and dislike conditions, children's choices between the two actors were random (binomial  $p > .10$ ). Thus, children were most likely to choose an item from the actor who shared their toy preference when that item was liked by the actor.

Finally, to determine whether children generalized their tendency to choose toys from the matching actor to their choice of books, we performed a binomial test for each condition to compare whether children who chose a toy from the matching actor were also more likely to choose a book from the same actor. For the favorite condition, children were highly likely to generalize from toys to books: 30 of the 38 children (79%) who chose the matching actor's favorite toy also selected her favorite book (binomial  $p = .0002$ ). In the unfamiliar and dislike conditions, children were also likely to choose a book from the matching actor after choosing her toy; however, the results were not as strong. Specifically, in the unfamiliar condition, 20 of 29 children (68%) chose the matching actor's book after choosing her toy (binomial  $p = .02$ ), and in the dislike condition, 17 of 26 children (65%) did so (binomial  $p = .05$ ). We found the same results when comparing the number of children who chose from the same actor twice, whether it was the matching or mismatching actor (favorite condition: 73%, binomial,  $p = .0007$ ; unfamiliar condition: 75%, binomial,  $p = .0002$ ; dislike condition: 65%, binomial  $p = .015$ ).

## Discussion

Children in both age groups tended to choose the favorite toys of the actor who had shown a preference for the same toys as the children earlier in the experiment. In contrast, when the toys being offered were items that the actors were unfamiliar with or disliked, children chose randomly between the two actors. These findings suggest that 2-year-old children recognize a shared preference for toys between themselves and another person and use that shared preference to inform their choices of new, unseen items. In addition,

<sup>3</sup> Interaction effects were not examined in the logistic regression because the data from this study did not have enough power to support such analyses. In addition, we did not have any a priori hypotheses that would lead us to expect interactions of our main effect with the other variables.

tion, children are sensitive to the circumstances under which an item is being offered, such that they only consider shared preferences as a useful source of information for favored, familiar items but not for unfamiliar or disliked ones. Children's random choices for unfamiliar and disliked items rule out two alternative explanations. Specifically, children were not making their choices based on a positive association with the matching actor, since they were not biased to choose her item in all three conditions. Second, children were not biased to choose all items that the matching actor was familiar with, since they chose randomly when the items were visually available to but disliked by the actors.

It is interesting to note that children could have actually reversed their choices in the dislike condition, rather than choosing randomly, since they could have recalled that all of the items that they themselves liked were items that the mismatching actor disliked, leading them to select new disliked items from her as well. This might suggest that children paid increased attention to positive compared with negative preference information. If children were primarily focused on the referents of the actors' positive emotions, they may not have encoded actors' dislikes as completely as their likes and thus been unable to recall that information later in the study to inform their choices. In addition, it is not clear what adults would infer in the same situation, thus it is difficult to determine whether there is a "correct" response in this case.

The second major finding was that when children were presented with a second pair of items to choose from—two favorite, unfamiliar, or disliked books—their choices followed the same pattern observed in their toy choices. They chose favorite books significantly more often from the actor who shared their toy preference but did not show this bias for unfamiliar or disliked books. This suggests that children may have expected the shared toy preference to apply to books as well, inferring that someone who liked the same toys as they did would also like the same books. This generalization is reasonable since books are similar to toys in that they could also be judged as either fun or boring. For example, children might have thought that the actor who liked boring toys would also like plain, boring books with few pictures, whereas the actor who liked fun toys would like interesting books with colorful pictures. Further support for this conclusion comes from the finding that children's choices of toys and books were related in the favorite items condition, such that they tended to choose favorite books from the matching actor after choosing her favorite toy. However, an alternative explanation is that children did not make a distinction between the two categories at all. Perhaps children did not even recall the specific category of the shared preference and only had a sense that they liked the same kinds of things as the matching actor.

Unexpectedly, children's choices across the two categories were also found to be related in each control condition. Again, children were more likely to choose a disliked or unfamiliar book from the matching actor after choosing her toy. In the control conditions, children had very little information on which to base their decisions, since the shared preference was not necessarily relevant. Thus, it is possible that children who were satisfied with the toy they received from the matching actor (after randomly selecting it from her in the first test question) decided to choose a book from her as well, given the lack of other input on which to base their decision.

These findings concerning the relatedness of children's choices of toys and books raise the question of the scope of children's reasoning process and their generalizations about shared preferences, in particular, whether children even consider the category of a shared preference. While it might be logical for a child to infer that someone who likes the same toys as she does will probably also like the same books, it may not be logical to infer a shared preference for foods or some other category of items unrelated to toys. If children make such distinctions across unrelated categories, it would show that they reason about when it may or may not be useful to generalize preferences.

It is important to note that a number of alternative explanations could account for the pattern of findings observed across the three conditions that do not require children to have an understanding of preferences. First, children could have used a behavioral rule to guide their choices. Whereas the unfamiliar and dislike conditions of Experiment 1 rule out the possibility that children were using a very simple behavioral rule that everything the matching actor is associated with is good, it is possible that children learned a more complex rule that the matching actor smiles when she sees a good toy, thus if she smiles at something, it must be good.

Second, children could have used an evaluative model, such that they viewed the matching actor more positively and thus chose items that she liked. Again, the evaluative model is partially ruled out by the findings in the unfamiliar and dislike conditions of the present study, since children did not infer that all things associated with the matching actor were positive, only items that she liked. Finally, children could have reasoned that the matching actor was a more reliable informant than the mismatching actor, such that information from her was more useful in judging which items are desirable. Each of these three alternative explanations predicts that children will select any item that the matching actor likes. Therefore, to rule out these possibilities, children would need to demonstrate that they do not always choose items liked by the matching actor.

## Experiment 2

Experiment 2 was designed to explore the scope of children's reasoning about shared preferences, as well as to rule out alternative explanations for the findings of Experiment 1. Children in Experiment 2 were presented with the contrasting preferences of two actors within one of two unrelated categories—foods or television programs. These categories were selected because they differ in critical ways, in particular, in how they are rated (i.e., foods are generally rated on the basis of taste, whereas television shows are generally rated on the basis of entertainment value). Thus, it is less likely that a shared preference for one would reliably indicate a shared preference for the other. However, to our knowledge, the question of whether children (or even adults) reason about shared preferences in this way has not been empirically addressed.

The present experiment thus addressed the issue of how children generalize information across categories. Research suggests that by preschool age, children readily generalize factual information across similar categories of things (e.g., from humans to dogs), but not across highly discrepant categories (e.g., from humans to cars; Gutheil, Vera, & Keil, 1998). Three- and 4-year-old children also make generalizations about the extent of different individuals'

knowledge across multiple domains, such that they expect a person who consistently knows objects' names to know those objects' functions as well (Koenig & Harris, 2005). In addition, 13-month-old infants have been shown to generalize object properties across items with high, but not low, perceptual similarity, unless the low similarity objects are labeled with the same word to indicate that they are members of the same category (Graham, Kilbreath, & Welder, 2004). Together, these findings suggest that young children are capable of judging the similarity of objects across categories and making appropriate inferences on the basis of those judgments.

As in Experiment 1, children in the current experiment observed, over the course of four training trials, that one actor's preference (e.g., for foods) consistently matched their own preference and the other actor's preference consistently mismatched theirs. Following this initial preference training, children's generalization of the shared preference was tested on novel items liked by each actor within the trained category (e.g., foods) and in a new, unrelated category (e.g., television programs). If children reason that a shared preference in one category is only informative within that specific category, they should more readily apply the shared preference to new items in the trained category compared with items in the untrained category during the test trials. Because no age differences were found in Experiment 1, only children from the older age group were included in Experiment 2.

## Method

**Participants.** Participants included 24 two-year-old children (15 girls, 9 boys) (mean age = 29 months 5 days, range = from 25 months 24 days to 30 months 19 days). Participants were recruited as in Experiment 1. The majority of the children were middle class and White (15), with the remainder of participants being Asian (5), Latino/a (2), African American (1), and Pacific Islander (1). Five additional children were excluded from the analyses for refusing to answer both test questions (4) or for experimenter error (1).

**Design.** The design of Experiment 2 is identical to that of Experiment 1, with the exception that instead of observing two actors demonstrate their preferences in the category of toys, half of the children observed the two actors demonstrate their preferences in the category of foods, while the other half observed the actors demonstrate their television show preferences. Children were then given test trials for both foods and television shows.

**Materials.** There were three phases in the experiment: introduction, training, and test.

**Introduction and training trials.** Materials for the introduction and training trials included items from one of the two categories, foods or television shows, that children were expected to like (i.e., desserts or child-oriented television shows) and dislike (i.e., vegetables or adult-oriented television shows). This allowed the matching actor to establish a shared preference with the child. Specifically, for the food preference training trials, materials included two plastic dinner plates and four realistic-looking replica desserts (cookie, doughnut, lollipop, and cupcake) and vegetables (cucumber, bell pepper, asparagus, and carrot). For the television program preference training trials, materials included four pictures from various child-oriented (fun) television programs (e.g., *Bob the Builder*) and four pictures from various adult-oriented (boring) television shows (e.g., evening news). Each picture was placed

inside one of two realistic-looking replica television sets constructed from black boxes with glass fronts. To ensure that children would share a preference with the matching actor, prior to the study, experimenters asked parents to choose four of the six possible fun shows (*Bob the Builder*, *Finding Nemo*, *Winnie the Pooh*, *Blue's Clues*, *Dora the Explorer*, and *Teletubbies*) that they believed their child liked most to be included in the training. In addition, parents were asked if any of the five possible boring television shows (golf tournament, evening news, *Antiques Roadshow*, weather, and a production of *Hamlet*) were liked by their child. If a child did like a boring show, we eliminated that show from the procedure, since it would not be construed as a "boring show" by that particular child. Otherwise, four of the five boring shows were chosen at random to be included in the four training trials. Previous research has shown that by 2 years of age (and with some methods even younger), toddlers understand the symbolic relationship between toy models and their "real" counterparts (Tomasello, Striano, & Rochat, 1999; Younger & Johnson, 2004). Thus, we anticipated no problem with children comprehending the use of "fake" foods and television sets in the present study and treating them similarly to the toys used in Experiment 1.

**Test trials.** Test item materials were chosen to be neutral, as in Experiment 1. To be clear, test items were neither strongly liked nor disliked by children, such that when a child chose an item in each test trial, they received neither strong positive nor negative feedback for their choice. Specifically, for the food test question, plastic fruits (apple and pear) were enclosed in each of two small opaque bags. Fruit could be viewed as more similar to the desserts, since they are sweet, or as more similar to the vegetables, since they are healthy. Thus, the fruit test items were considered to be neutral since it was plausible that they could be the favorite food of either actor. For the television test question, the two additional fun television shows that the parents reported that their child liked least (but did not dislike) were used. Since these shows were not children's most favored, they were considered neutral and could be viewed as being liked by either actor.

**Procedure.** As in Experiment 1, the child was seated across from two female actors, and parents sat in a chair behind the child and were asked to be silent throughout the procedure. Before the first training trial, the two actors briefly introduced the child to the category (foods or television shows) that the child would not be trained on (untrained category) in order to expose the child to the untrained category so that it would be somewhat familiar to the child when items from this category appeared later in the test trials. Specifically, children in the television training condition were briefly shown a plate containing several of the replica foods and told that they would have a chance to choose a snack later. Children in the food training condition were briefly shown the two replica television sets with no television show visible and told that they would have a chance to choose a show later. Thus, children were familiarized with the replica food or television items—whichever category was not introduced on the training trials—prior to testing.

**Training trials.** As in Experiment 1, the two actors demonstrated their opposite preferences during four training trials, such that the matching actor consistently showed a preference for fun television shows and the mismatching actor, a preference for boring shows (in the television training condition), or the matching actor consistently showed a preference for desserts and the mis-



matching actor for vegetables (in the food training condition). Each training trial progressed in the same manner as in Experiment 1, except that instead of pairs of toys, pairs of television shows or foods were revealed and commented on by the actors. For example, in a television training trial, the two replica television sets were revealed, each displaying a show, one fun (e.g., *Bob the Builder*) and one boring (e.g., *Hamlet*). Each experimenter expressed her preference for one show. In a food training trial, two replica food items, one dessert (e.g., cupcake) and one vegetable (e.g., carrot) were revealed. Each experimenter expressed her preference for one food item.

As in Experiment 1, we needed to establish that each child did in fact share a preference with one actor. For the television training condition, the parental report of children's favorite shows was used to ensure that the child liked the television shows that the matching actor preferred. Since we did not collect parental reports for children's food preferences, at the end of each food training trial, children were asked which of the two foods they preferred. This allowed us to establish that the child indeed liked the same foods as the matching actor.<sup>4</sup>

**Test trials.** We designed the test trials to examine whether children recognized the shared preference within the trained category (e.g., television shows) and whether they generalized it to the untrained category (e.g., foods). For the television test trial, both actors retrieved their televisions but kept the screens facing themselves so the child could not see the program. Each actor looked at her television's screen and said in an excited tone, "This is my favorite show." While displaying a positive facial expression, the actors then asked the child to choose a show, saying, "You can pick one of these shows to see—my favorite show [Actor 1], or my favorite show [Actor 2]." After the child chose a television by pointing to it or touching it, the other television was removed from the table, and the chosen television was turned toward the child so he or she could view it. The food test trial was identical to the favorite toy test trial, with each actor claiming to have her "favorite snack" enclosed in a small opaque bag and asking the child to choose one and then giving the child the opportunity to play briefly with the enclosed item. The order of test trials was counterbalanced with respect to which actor (matching or mismatching) asked each question.

**Coding.** Children's choices during test trials were coded as in Experiment 1. Coder agreement for children's choices was 100%. Actor enthusiasm on training trials was also rated by two independent coders as in Experiment 1. Initial coder agreement for enthusiasm was 94%. After all disagreements between coders were resolved, they concluded that actor enthusiasm was equal on 99% of trials. Finally, independent coders rated 33% of the test questions as to whether the intensity of actors' expressions of liking were equal or unequal. Initial coder agreement was 88%, and once all disagreements were resolved, the coders agreed that the actors showed equal intensity of expressions on 94% of test questions.

## Results

Logistic regression revealed that children selected the favorite items from the matching in the trained (88%) but not the untrained (54%) category (see Figure 3). Thus, the main finding of Experiment 1—that children reason about shared toy preferences and choose new liked toys from someone who shares their prefer-

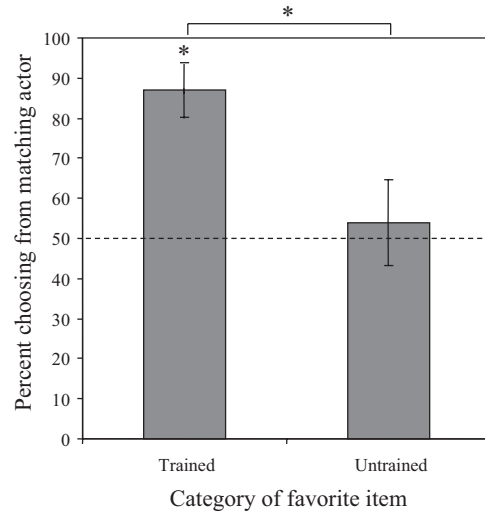


Figure 3. Percentage of test trials on which children chose favorite items (foods and television shows) when they were in the trained versus the untrained category from the actor who demonstrated a shared preference with the child in Experiment 2. Children who were trained on actors' food preferences or television show preferences chose the favorite trained category item of the matching actor more often than expected by chance and more often than they chose her favorite untrained category item. Dashed line indicates chance (50%); errors bars indicate standard error of the mean.

ence—was replicated for two new categories: foods and television shows. The initial model predicted the likelihood of children choosing the matching actor's favorite item from whether the test question was in the trained or untrained category. This model showed that children were more likely to choose favorite items from the matching actor when those items were in the trained category ( $\beta = -1.78$ , Wald  $\chi^2 = 5.77$ ,  $p = .02$ ). This finding suggests that children do not indiscriminately choose liked items from the matching actor. Rather, they seem to make distinctions across categories of items such that they are less likely to choose a favorite item of someone who shares their preference when that item is in a very different category than that of the shared preference. A second logistic regression model, which included the additional predictors of child gender and trained category (television or food), revealed that the effect of test question category (trained or untrained) held with the addition of the new predictors ( $\beta = -1.87$ , Wald  $\chi^2 = 5.96$ ,  $p = .02$ ) and that there were no significant effects for either gender ( $\beta = -0.42$ , Wald  $\chi^2 = 0.31$ ,  $p = .58$ ) or trained category ( $\beta = 1.07$ , Wald  $\chi^2 = 2.06$ ,  $p = .15$ ).

To further examine children's matching actor choices across items, we performed binomial tests to compare mean choices of the matching actor's item to chance. Results revealed that children chose items from the matching actor significantly above chance when those items were in the trained category (binomial  $p = .007$ ) but not the untrained category (binomial  $p > .10$ ). In addition, a Wilcoxon signed rank test was used to compare choices of items in the trained versus the untrained category from the matching actor.

<sup>4</sup> In 21 of 24 cases, children matched the preference of the actor who liked desserts.



In other words, we tested whether children were more likely to choose a favorite item from the matching actor when the item was in the trained than the untrained category. Children chose the matching actor's favorite item in the trained category item significantly more often than her favorite item in the untrained category ( $Z = -2.83, p = .005$ ). These results suggest that children were discriminating between items from the trained and untrained categories on test trials (see Figure 3).

Finally, to examine whether children generalized from their first choice to their second, as was observed in Experiment 1, we performed a binomial test to compare whether children were more likely to choose the matching actor's favorite item in the untrained category after choosing her favorite item in the trained category. It is important to note that unlike in Experiment 1, children were not more likely to choose the matching actor's favorite untrained category item after choosing her favorite trained category item. In fact, of the 21 children who chose the matching actor's favorite item for the trained category, only 13 (62%) chose from her again for the untrained category (binomial  $p = .10$ ).

## Discussion

The findings of Experiment 2 suggest that 2-year-old children discriminate across unrelated categories of items when considering shared preferences, such that they do not universally trust the opinion of someone with whom they share a preference. Children who learned that they shared a preference for foods or television programs with one actor tended to choose to see her favorite item in that same category more often than expected by chance and more often than they chose to see her favorite item in the other category. Finally, unlike in Experiment 1 in which children who initially chose the toy of the person who shared their toy preference tended to choose her book afterward, children in Experiment 2 were not more likely to choose a favorite item in the untrained category from the matching actor after choosing her item in the trained category. Comparing these findings with those of Experiment 1, we can rule out the possibility that children chose both items from the same actor because of perseveration. In addition, we can conclude that children are less likely to generalize a shared preference across unrelated categories, such as foods and television shows, than related ones, such as toys and books.

The results of Experiment 2 rule out a number of possible alternative explanations for Experiment 1. Specifically, if children's choices in these experiments were based on a behavioral rule (e.g., every time the matching actor smiles at something, it is desirable), evaluative reasoning (e.g., everything the matching actor likes is desirable), or reliability (e.g., the matching actor knows what's desirable), they would have been equally likely to choose favorite items from the matching actor, regardless of the category of their shared preference. However, this was not the case. The current findings suggest that 2-year-old children display discrimination about when to consider a shared preference for a new liked item on the basis of the category of that item and do not universally trust the opinion of someone who shares their preference for one kind of thing.

## General Discussion

The present findings show that children as young as 2 years of age are capable of recognizing when their own preferences corre-

spond to those of another person and actively applying that understanding to new situations. To our knowledge, this is the first study in which young children have been found to recognize shared preferences and use this information in their everyday reasoning, suggesting that children's dispositional understanding is far more sophisticated than previously thought. Experiment 1 showed that after interacting with two individuals with opposite toy preferences, children recognized which person had a similar preference to their own, such that when they were later asked to choose between these two individuals' favorite toys and books, they tended to select the favorite item of the person who shared their toy preference. This suggests that children inferred that the favorite toy or book of someone who likes the same kinds of toys would be a toy or book that they would find desirable.

When children were offered pairs of toys and books that the actors were unfamiliar with or disliked, they chose randomly between the two. This suggests that children understand that while considering shared preferences may be useful when hearing about a person's favorite items, such shared preferences are not necessarily informative for things that a person is unfamiliar with or dislikes. This result rules out the possibility that children are simply biased by a halo effect that prompts them to choose items from one person on the basis of a positive association created by the shared preference.

The findings of Experiment 2 revealed that 2-year-old children also have the capacity to evaluate the relevance of a shared preference in one category for an unrelated category. Here, children chose favorite items from the actor who shared their preference when those items were in the same category as the shared preference (e.g., foods) but chose randomly between favorite items in an unrelated category (e.g., television shows). It is important to note that these results extend our original finding that children select favorite toys from an individual who shares their preference to two additional categories—foods and television shows. These findings together with those of Experiment 1 indicate that children have sophisticated notions about when it is and is not logical to refer to a shared preference. Specifically, shared preferences may be informative in the same or similar categories to the one originally established (e.g., toys and books) but not for categories that are unrelated to the original shared preference (e.g., foods and television shows). Children seem to understand that toys and books are related enough that a shared preference in one can reliably indicate a shared preference in the other (e.g., they can both be rated as fun, colorful, and so on), while foods and television shows are not (e.g., foods are rated on taste while television shows are rated on excitement, humor, and so on). Thus, it appears that children can combine their conceptual knowledge of categories to inform their use of social information.

Given that children always chose items in the untrained category after choosing in the trained category in Experiment 2, it could be argued that children's random choices of favorite items in the untrained category might be due to memory limitations. That is, they quickly forget who shared their preference and thus are unable to use that information to guide their choice in the untrained category. However, in Experiment 1, children always made their choice of a book following their choice of a toy, and no such decrease in choices from the matching actor was seen in those results. Thus, it is unlikely that children quickly forget the shared

preference and that that is the cause of their random choices in the second test question on Experiment 2.

Experiment 2 also served to address several alternative explanations for the findings of Experiment 1. Instead of recognizing the two individuals' preferences and realizing that only one was similar to their own, children in Experiment 1 could have used a behavioral rule that guided them to choose items toward which the matching actor showed positive affect. A second alternative is that children used evaluative reasoning to view everything that was liked by the matching actor as desirable. While these explanations could account for the results of Experiment 1, they cannot account for children's choices in Experiment 2. That is, children were biased only to choose the favorite item of the actor who shared their preference when that item was in the same category as the shared preference. This finding suggests that children discriminated across categories of liked items and did not judge as desirable all items that the matching actor liked.

A third alternative explanation for the results of Experiment 1 is that children were thinking of the individual who shared their preference as a veridical, reliable viewer of the items and the other individual as a faulty viewer. For example, Koenig and Harris (2005) found that preschoolers recognize when an informant is reliable or not and are more likely to trust the reliable informant. If this was how children viewed the actors in the present experiments, they would not have been demonstrating knowledge of the subjective nature of preferences but only that individuals can give either reliable or unreliable information about objects. However, the findings of Experiment 2 suggest that this explanation is unlikely—or at least that children are sensitive to the category for which an individual is a reliable informant. Reliability can be viewed as a consistent trait or disposition, much like a preference. Thus, the primary difference between these two explanations is an issue of whether children are considering the provided information to be subjective (e.g., "You and I like the same things, so your opinion is valuable to me") or objective (e.g., "You know which things are good, so your opinion is valuable to anyone"). Teasing apart these two possibilities is a worthwhile area for future research.

The present findings appear to contrast with those of studies with older children, which have shown that preschoolers do not expect consistency in others' desires and actions (Kalish, 2002) and do not use preferences in inferring others' actions (Kalish & Shiverick, 2004). In the present research, however, children did expect that a person who liked a certain kind of thing (i.e., fun toys) would continue to like that kind of thing, and they used their knowledge of each individuals' own preferences to make inferences about that person (such as what kinds of things she would find desirable). There are a number of reasons why children may have shown greater success in the present studies. First, multiple instances of salient behavior indicating each actors' preference were provided, giving children more evidence from which to infer a consistent preference and to form their own judgments. Second, children were actively involved in the test situation, making choices that were personally relevant, which likely increased their motivation to respond carefully on test trials. Finally, asking children to make active choices is a more natural and less demanding task, compared with requiring verbal judgments and predictions. Together, these factors likely simplified the current task for

children, allowing them to exhibit their knowledge of others' preferences.

Research on the development of preferences adds to our growing knowledge of children's understanding of people as social and intentional agents. Children's knowledge of people's preferences builds on what they know about others' desires, dispositions, and behaviors. In order to recognize a preference, children must understand that other people can have specific desires that are consistent over time and that individuals behave in accordance with these desires. Understanding that preferences are a unique feature of each individual is similar to understanding personal dispositions, since dispositions are consistent within each person over time but often differ across people.

The recognition of individuals' dispositions has implications for children's social development as well. Coming to understand people as unique individuals, some of whom are more or less similar to oneself, allows one to make predictions about others' behaviors, opinions, and desires. Predictions can be made either by projection, whereby information about oneself is used to make an inference about another person, or by stereotyping, whereby information about a group that that individual belongs to is used in making inferences. Judgments of similarity likely play a role here, since people are more likely to use projection with individuals who are similar to themselves and stereotyping with individuals who are dissimilar (Ames, 2004). Exploring children's reasoning about similarity to others should thus provide insight into how they form expectations about individuals and also increase our knowledge of the early roots of person perception.

In sum, the present study shows that by the third year of life, children are capable of recognizing another's preference, determining whether that preference matches their own, and using this knowledge to make inferences about that person's behavior to guide their own decisions. Consequently, children use this information in their goal-oriented behavior. This ability is quite sophisticated and demonstrates children's early developing capacity for social-cognitive reasoning. Future research holds the promise of enabling investigators to determine with more precision what information children rely on to recognize the preferences of others, their assumptions about how preferences should generalize across categories and individuals, and how this might influence other aspects of human social interaction.

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