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Social categories guide young children's preferences for novel objects

Kristin Shutts, Mahzarin R. Banaji, and Elizabeth S. Spelke
Harvard University

Abstract

To whom do children look when deciding on their own preferences? To address this question, three-year-old children were asked to choose between objects or activities that were endorsed by unfamiliar people who differed in gender, race (White, Black), or age (child, adult). In Experiment 1, children demonstrated robust preferences for objects and activities endorsed by children of their own gender, but less consistent preferences for objects and activities endorsed by children of their own race. In Experiment 2, children selected objects and activities favored by people of their own gender and age. In neither study did most children acknowledge the influence of these social categories. These findings suggest that gender and age categories are encoded spontaneously and influence children's preferences and choices. For young children, gender and age may be more powerful guides to preferences than race.

Social categories guide young children's preferences for novel objects

Humans are extraordinarily gifted at using the social world to learn what works or does not, what's good or bad, and what's right or wrong. Social and cultural learning begin at an early age (e.g., Bandura, 1965; Csibra & Gergely, 2006; Tomasello, Kruger, & Ratner, 1993) and raise a question about children's reliance on information provided by others: Whose input do children favor? Research suggests that adults gain knowledge from other people selectively, favoring informants who are similar to themselves along a variety of dimensions, including shared social group membership (e.g., Brock, 1965; Ryu, Park, & Feick, 2006; Stotland, Zander, & Natsoulas, 1961; Whittler & DiMeo, 1991). The categories of gender, race and age are particularly influential in many social contexts (Brewer, 1988; Fiske, 1998). In the present experiments, we ask whether and to what degree preschool-age children use these categories spontaneously to determine their own preferences for novel objects and activities.

Previous research provides evidence that like older children, preschool-age children are positively disposed toward individuals of their own gender, race, and age (for reviews, see Aboud, 1988; Levy & Killen, 2008; Quintana & McKown, 2008; Ruble, Martin, & Berenbaum, 2006). Naturalistic observations of children's social environments reveal that preschool-age children tend to play with same-gender and same-age peers (French, 1987; La Freniere, Strayer, & Gauthier, 1984; Maccoby & Jacklin, 1987; Martin & Fabes, 2001; Martin, Fabes, Evans, & Wyman, 1999). When tested in laboratory-based tasks that feature pictures of, or stories about, unfamiliar children, preschoolers say that they would prefer to be friends with other children of their own gender (e.g., Martin, 1989; Martin et al., 1999), and majority-race children indicate they would prefer to be friends with other children of their own race (Kircher & Furby, 1971; Kowalski & Lo, 2001). Additionally, in studies of evaluative inter-group bias, preschool-age children assign more positive than negative traits

to individuals of their own gender (Albert & Porter, 1983; Yee & Brown, 1994), as well as to individuals of their own race, at least when that race has high status (Aboud, 1988; Bigler & Liben, 1993).

In addition to showing early social and evaluative preferences based on social group membership, young children see individuals as having properties and preferences in common with other people from the same social category. Studies of children's gender stereotyping, for example, provide evidence that preschool-age children are aware of sex-typed activities and preferences for objects, and use gender information to predict who will like familiar items such as dolls and trucks (Bauer & Coyne, 1997; Kuhn, Nash, & Bruckner, 1978; Leinbach, Hort, & Fagot, 1997; Martin, 1989; Martin & Little, 1990; Reis & Wright, 1982). Thus, young children are capable of learning about the typical preferences of boys and girls in their social environment.

Of particular relevance to the present work are studies showing that children use verbally labeled information about gender, age, ethnicity, and social class to guide inferences about shared *novel* properties of others (Diesendruck & haLevi, 2006; Gelman, Collman, & Maccoby, 1986; Hirschfeld & Gelman, 1997; Taylor & Gelman, 1993). In a study of children aged 4–7 years, for example, Gelman et al. (1986) assessed participants' use of gender information to make inferences about novel biological properties. For instance, after learning that one child described as a girl had “estro” in her blood and that another child described as a boy had “andro” in his blood, children inferred that a second girl had *estro* rather than *andro* in her blood. Other studies have shown that children also use social categories to make inferences about other children's preferences for novel objects and activities (e.g., Diesendruck, & haLevi, 2006; Martin, Eisenbud, & Rose, 1995). Diesendruck & haLevi (2006), for example, found that when an adult labeled two pictures of children with the same ethnic label (e.g., Arab) and one picture with a different label (e.g., Jew), children generalized novel activity preferences (e.g., “likes to play zigo”) along ethnic category lines (e.g., by indicating that the two Arab children liked to play zigo). These findings suggest that young children's social categories are productive and support inferences about the behavior of other people in new situations.

If young children preferentially interact with individuals of their own gender, race, and age, and if they assume individuals who belong to the same social group share common properties and preferences, then preschool-age children might attend to social category information of others when deciding on their own preferences for new objects or activities. Indeed, studies of same-sex modeling have shown that when young children are presented with multiple male and female models engaging in different behaviors, children preferentially imitate actions demonstrated by adults of their own gender (Bussey & Bandura, 1984; Perry & Bussey, 1979). Children also are influenced by the preferences of same-sex others when evaluating unfamiliar or novel objects (e.g., Bradbard & Endsley, 1983; Bradbard, Martin, Endsley, & Halverson, 1990; Martin et al., 1995; Martin & Little, 1990; Masters, Ford, Arend, Grotevant, & Clark, 1979; Ruble, Balaban, & Cooper, 1981). Ruble et al. (1981) reported that a subset of 4- to 6-year-old children who scored high on a test of gender constancy spent more time playing with a gender-neutral toy after watching a same-sex child play with the toy. Additionally, when preschool-age children were shown a set of novel toys and told that some were liked by girls and some were liked by boys, children expressed greater liking for the objects preferred by children of their own gender (Bradbard & Endsley, 1983; Martin & Little, 1990; Martin et al., 1995; Masters et al., 1979). In most of these studies, however, gender was mentioned to children explicitly, leaving open the question whether children use gender spontaneously to guide their evaluations of new objects and activities. With verbal labeling, even arbitrary social categories can be made salient for children or adults (Patterson & Bigler, 2006; Tajfel, Billig, Bundy, & Flament,

1971), but adults encode only a small subset of the logically possible social categories in the absence of labels (e.g., Stangor, Lynch, Duan, & Glass, 1992). It is important to discover, therefore, which social categories are activated and used by children spontaneously.

In the present studies, we sought to understand whether gender guides children's novel object preferences spontaneously, and whether other social categories similarly influence children's choices. Across two studies, we presented three-year-old children with social category distinctions of gender and race (Experiment 1) or gender and age (Experiment 2) in the absence of verbal labeling. We focused on these three social categories because they have been shown to be primary in studies of adults (e.g., Brewer, 1988; Fiske, 1998). We tested children who are both more homogeneous in age, and younger in mean age, than the participants in past studies. Recent studies suggest that even young infants may be attentive to information that denotes individuals' gender, age, and race (e.g., Bar-Haim, Ziv, Lamy, & Hodes, 2006; Brooks & Lewis, 1976; Kelly et al., 2005; Ramsey, Langlois, & Marti, 2005). Studies of young children therefore can fruitfully explore the origins and development of these social categories, as well as their influence on children's preferences and behaviors.

In our experiments, children saw pairs of photographs of people accompanied by audio clips in which each person endorsed a different toy, food, game, or clothing item, and then children were asked which object or activity they preferred for themselves. The individuals in a pair differed in gender (male, female), race (White, Black), or age (child, adult), but this difference was not labeled or highlighted. The objects and activities were novel, and therefore not associated with any specific gender, race, or age. We assessed and compared the effects of the three social categories on children's choices.

Experiment 1

Experiment 1 investigated the impact of gender and race information on three-year-old children's preferences for novel objects. In a series of "gender trials," children were presented with displays consisting of one male child and one female child, each of whom endorsed a different object or activity (half of gender trials featured a pair of White children, and half featured a pair of Black children). In a series of "race trials," children were presented with displays consisting of one White child and one Black child, each of whom endorsed a different object or activity (half of race trials featured a pair of male children, and half featured a pair of female children). On each trial, children were asked which object or activity they preferred.

Because we planned to directly compare children's use of gender and race information to guide preferences for novel items, we sought to equate the types of information available to distinguish members of pairs on gender trials and members of pairs on race trials: There were no voice cues to category membership on race trials or gender trials. All race trials featured voices recorded from two different White children; all gender trials featured voices recorded either from two different boys or two different girls. All race trials featured race-neutral names. Gender trials featured two gender-neutral names on half of trials, and two gender-informative names on half of trials, as previous work has demonstrated that preschool-age children are sensitive to relationships between gender and proper names (Bauer & Coyne, 1997).

Method

Participants—Thirty-two three-year-old children participated in the experiment (16 females; mean age = 3 years, 5 months; range = 3 years, 1 month – 4 years, 0 months). Two additional children were excluded from the final sample due to experimenter error. All participants were White and came from the greater Boston area. Parents of participants

estimated that their children attended schools and lived in neighborhoods where approximately 80% of individuals were White, and less than 10% of individuals were Black. Parents were also asked to indicate the racial identity of the three people with whom their child spent the most time each week. By this measure, only one child in the sample spent a significant amount of time with a Black individual.

Materials—The experiment was presented in PowerPoint on a laptop computer (Figure 1). Gender trials used 8 photographs of young girls (4 White, 4 Black) and 8 photographs of young boys (4 White, 4 Black) arranged into 4 boy-girl pairs that were White and 4 boy-girl pairs that were Black. Race trials used 8 photographs of White children (4 boys, 4 girls) and 8 photographs of Black children (4 boys, 4 girls) arranged into 4 White-Black pairs that were male and 4 White-Black pairs that were female. The pairs of photographs used in each trial were matched for age and attractiveness, based on ratings by a group of adults. Each photograph was accompanied by a voice recording of a male or female child endorsing one of the objects (see below). Two sets of 16 object pictures (4 toys, 4 foods, 4 games, and 4 items of clothing), judged by adults to be unfamiliar, were printed onto individual stickers that could be placed into a book. Each item was labeled with a unique novel word (e.g., *spoodle*, *blicket*).

Procedure—Children were tested in a quiet room in the lab or at their preschool. Children sat in front of the testing computer next to an experimenter, while a coder stood behind them (out of the children's line of sight) to record responses. If parents were present during the testing session, they also sat out of children's line of sight, and were instructed not to say anything or otherwise interfere with the session.

The experimenter introduced the task by saying, “Today I am going to show you a bunch of new toys, foods, games, and clothing, and ask you which things you might like to try. You've never seen any of these things before, so I'm going to let you see what other kids thought about each of the things before you choose.” At the beginning of each trial, a photograph of a child and a picture of an object appeared on the left side of the screen accompanied by a preference statement recorded in a child's voice (e.g., My name is Mary. I love playing with spoodle. Spoodle is my favorite thing to play with). Then, that photograph and object disappeared, and a different photograph and object appeared on the right side of the screen accompanied by a different preference statement (e.g., My name is Kevin. I love playing with blicket. Blicket is my favorite thing to play with). Then, those pictures disappeared, both photographs reappeared with their objects, the experimenter placed stickers depicting the objects beneath the corresponding photograph-object pairs on the screen, and she elicited a choice (e.g., Now it's your turn to choose. Would you rather play with spoodle like Mary, or blicket like Kevin?). After children chose a sticker, they placed it in the sticker book. The experimenter never labeled the gender or race of individuals in the photographs, used no gendered pronouns, and gave children neutral feedback on their responses.

Following completion of all gender and race trials, children were queried about their sticker selections. The experimenter returned to the first trial on which children had chosen the object preferred by the person who matched them in gender, as well as the first trial on which children had chosen the object preferred by the person who matched them in race. Children were shown the photograph-object pairings again, were reminded which sticker they had chosen, and were asked why they selected that sticker.¹

¹Justification data were not available for 3 trials.

Design—All children were given a block of 8 consecutive gender trials (half of each race) and block of 8 consecutive race trials (half of each gender). Half of gender trials presented gender-typical names, while half presented gender-neutral names (e.g., Jordan and Bailey). Additionally, half of the gender trials contained two male voices, while half contained two female voices (adults could not easily discriminate the voices by gender). All race trials presented gender-consistent voices and race-neutral names. Children saw one set of objects for gender trials, and a different set of objects for race trials. Object pairs within a set were presented in the same order (toys, foods, games, clothing) for all children. The order of trials (gender trials first or race trials first), order of gender trial pairs (4 consecutive White pairs first or 4 consecutive Black pairs first), order of race trial pairs (4 consecutive male pairs first or 4 consecutive female pairs first), pairings of object sets to trial types, and pairings of objects to photographs were counterbalanced across children. The lateral positions of the same-gender or same-race child, and order of speaking of the same-gender or same-race child, were counterbalanced within and across participants.

Dependent measures and analyses—The percentage of trials on which children chose the object endorsed by a child of their own gender or race was computed separately. These scores were tested against chance (50%) by *t* tests and were compared to one another by a repeated-measures analysis of variance (ANOVA).

Results

Children tended to choose objects and activities preferred by other children of the same gender (Figure 2). Overall performance on gender trials differed from chance ($M=68.75\%$, $SD=20.58$, $t(31)=5.16$, $p<.001$, $d=.91$), but overall performance on race trials did not ($M=55.86\%$, $SD=18.51$, $t(31)=1.79$, $p=.083$, $d=.32$). An ANOVA with category (gender vs. race trials) as a within-subject factor, and category order (gender vs. race trials presented first) and participant gender as between-subject factors, revealed a main effect of category ($F(1,28)=7.56$, $p<.05$, $\eta_p^2=.21$), indicating more same-gender than same-race choices. There were no other main effects or interactions.

Gender trials—For gender trials, a repeated-measures ANOVA with race of pair (White vs. Black) as a within-subject factor, and order (White vs. Black pair trials first) and participant gender as between-subject factors, revealed no significant effects or interactions. One-sample *t* tests confirmed that children performed above chance on gender trials featuring White pairs as well as on gender trials featuring Black pairs ($M_{\text{white}}=74.22\%$, $SD=25.78$, $t(31)=5.31$, $p<.001$, $d=.94$; $M_{\text{black}}=63.18\%$, $SD=31.10$, $t(31)=2.42$, $p<.05$, $d=.42$). Paired-sample *t*-tests comparing gender effects for toys, foods, games, or clothing revealed no differences among the item types. Paired-sample *t* tests also revealed no effects of gender-informative vs. gender-neutral names on performance on gender trials ($t(31)<1$), and no effects of the gender of the voices ($t(31)<1$).

Race trials—For race trials, a repeated-measures ANOVA with gender of pair (male vs. female) as a within-subject factor, and order (male vs. female pair trials first) and participant gender as between-subject factors, revealed no significant main effects or interactions. Secondary analyses of object kind effects revealed that children chose the item endorsed by the same-race child significantly more often on toy trials than on food trials ($t(31)=2.90$, $p=.007$) and significantly more often on clothing trials than on food trials ($t(31)=2.96$, $p=.006$) after Bonferroni correction. One-sample *t* tests indicated that performance on toy trials and clothing trials was above chance ($t(31)=3.22$, $p<.005$; $t(31)=2.55$, $p<.05$; respectively) whereas performance on food and game trials was not ($t(31)=-1.31$, $p=n.s.$; $t(31)<1$; respectively).

Children rarely focused on the endorsers when justifying their sticker choices. When asked about their choice on a gender trial, 16 children gave no response, said “I don’t know,” or gave an uninformative answer (e.g., “Because I did it”), 12 children appealed to their own preference (e.g., “Because I like this one”), and 3 children appealed to object properties (e.g., “Because it’s pink”). No children appealed to properties of the endorsing people (e.g., “Because she’s a girl”), or to the endorsements themselves (e.g., “Because she likes this one”). When asked about their choice on a race trial, 14 children gave no meaningful response, 12 children referred to their own preference, 1 child referred to a property of the object, and 3 children referred to the person (e.g., “Because that girl liked that”).

Discussion

Both male and female children showed a strong preference for novel objects endorsed by unfamiliar children of their own gender. Children preferred items endorsed both by same-gender children of their own race, and by same-gender children of a different race. Gender categories influenced three-year-old children’s preferences between objects, in the absence of any explicit labeling of the gender categories or use of gendered pronouns, and regardless of whether target children’s names were gender-specific or gender-neutral. Moreover, the effect of gender on children’s preferences was stronger than the effect of race, as shown by the significant difference between overall performance on gender vs. race trials. Taken together, the findings from Experiment 1 suggest that when three-year-old children evaluate novel objects, an endorser’s gender is weighted more heavily than an endorser’s race.

Although children showed a strong and consistent effect of gender on their object choices, this effect was not reflected in children’s explanations of their choices. When asked why they chose an object endorsed by a same-gender child, no children appealed to the endorsing child in explaining their choices. The effect of gender on children’s choices therefore does not appear to be highly accessible to children when they reflect on their own preferences. It is possible, however, that children’s failure to refer to endorsers during post-test questioning stemmed from limits to their source memory (e.g. Drummey & Newcombe, 2002; Sommerville & Hammond, 2007) or capacity for verbal expression rather than from limits to their awareness of gender.

In Experiment 2, we sought both to replicate the gender effect and to investigate children’s spontaneous use of age, the third social category that is resiliently encoded by adults, by presenting children with items endorsed by unfamiliar same-age children and by unfamiliar adults. Previous research makes contrasting predictions about children’s reliance on peers vs. adults in guiding preferences. On the one hand, preschool-age children believe adults to be more knowledgeable than children about many aspects of the world (Neely & Jaswal, 2006; Taylor, Cartwright, & Bowden, 1991). On the other hand, children believe other children to be more knowledgeable than adults about toys (VanderBorghet & Jaswal, 2009), and studies have shown that peers can exert powerful influences on children’s preferences (e.g., Birch, 1980; Hedy & Raudenbush, 2000; Kornhaber & Schroeder, 1975). Thus, we investigated whether endorsements by unknown same-age peers are more effective than endorsements by unknown adults in guiding children’s choices among novel items.

Experiment 2

Experiment 2 used the method of Experiment 1 with the categories of gender and age. In a block of “gender trials,” participants were presented with displays consisting of one male and one female (half of gender trials featured a pair of children, and half featured a pair of adults). In a block of “age trials,” participants were presented with displays consisting of one child and one adult (half the age trials featured a pair of females, and half featured a pair of

males). As in Experiment 1, children were asked to select their preferred object or activity on each trial.

Method

Participants—A different group of 32 three-year-old White children was drawn from the same population as in Experiment 1 (16 females; mean age = 3 years, 6 months; range = 3 years, 1 month – 4 years, 0 months). One additional child was excluded from the sample due to parental interference.

Materials, Procedure, and Design—The method was the same as Experiment 1, except as follows. All photographs depicted White children and adults. All children were given a block of 8 consecutive gender trials (half of each age) and a block of 8 consecutive age trials (half of each gender). Photographs were again paired according to adult ratings of age and attractiveness, and relevant factors were counterbalanced within and across children as in Experiment 1. Child photos were accompanied by the same audio clips used in Experiment 1; adult photos were accompanied by audio preference statements recorded from male and female adults. Children's choices were recorded and analyzed as in Experiment 1.²

Results

Children tended to choose objects and activities endorsed by other people of the same gender and age (Figure 3). Overall performance differed from chance for both gender trials ($M=66.41\%$, $SD=22.99$, $t(31)=4.04$, $p<.001$, $d=.71$) and age trials ($M=63.67\%$, $SD=20.91$, $t(31)=3.70$, $p<.001$, $d=.65$). An ANOVA with category (gender vs. age trials) as a within-subject factor, and category order (gender vs. age trials first) and participant gender as between-subject factors revealed no effect of category ($F(1,28)<1$): Participants were highly and equally likely to make same-gender and same-age choices. There was an interaction of category by category order: Participants made relatively more same-gender than same-age choices when gender trials were presented in the second block and more same-age and than same-gender choices when age trials were presented in the second block ($F(1,28)=4.48$, $p<.05$, $\eta_p^2=.14$). Finally, there was a main effect of participant gender such that girls made more same-category choices than boys ($F(1,28)=4.85$, $p<.05$, $\eta_p^2=.15$); this effect did not interact with other variables.

Gender trials—For gender trials, a repeated-measures ANOVA with age of pair (child vs. adult) as a within-subject factor, and order (child vs. adult pair trials first) and participant gender as between-subject factors revealed that girls made more same-gender object choices than boys did ($M_{\text{girls}}=75.78\%$, $SD=22.11$; $M_{\text{boys}}=57.03\%$, $SD=20.40$; $F(1,28)=5.91$, $p<.05$, $\eta_p^2=.17$). The ANOVA revealed no other significant main effects or interactions. Performance was above chance for both child and adult gender trials ($M_{\text{child}}=70.31\%$, $SD=25.75$, $t(31)=4.46$, $p<.001$, $d=.79$; $M_{\text{adult}}=62.50\%$, $SD=26.94$; $t(31)=2.63$, $p<.05$, $d=.46$). Additional t tests revealed no difference between trials with gender-typical and gender-neutral names ($t<1$) and no differences in the strength of the gender effect for the different item types.

Age trials—For age trials, a repeated-measures ANOVA with gender of pair (male vs. female) as within-subject factor, and order (male vs. female pair trials first) and participant gender as between-subject factors revealed an effect of gender of pair ($F(1,28)=4.70$, $p<.05$, $\eta_p^2=.14$): Participants were more likely to choose the object endorsed by the child on trials featuring a boy vs. a man than on trials featuring a girl vs. a woman ($M_{\text{male}}=69.53\%$,

²Six children provided no justification data.

$SD=23.53$; $M_{\text{female}}=57.81\%$, $SD=28.00$). There were no other significant effects or interactions. One-sample t tests indicated that performance in the age block was above chance for both same- and other-gender age trials ($M_{\text{same}}=64.84\%$, $SD=24.48$, $t(31)=3.43$, $p<.005$, $d=.61$; $M_{\text{other}}=62.50\%$, $SD=28.40$, $t(31)=2.49$, $p<.05$, $d=.44$). A series of t -tests revealed no effects of item type on children's age-specific choices.

When children were asked about their choices on a gender trial, 13 children gave no meaningful response, 7 children simply reiterated their own preference, 3 children commented on an aspect of the object, and 3 children referred to one of the people (e.g., "Because she likes that food"). When asked about their choices on an age trial, the numbers of responses in each category were the same.

Discussion

As in Experiment 1, children preferred objects endorsed by others of the same gender, both when the endorsers were children and when they were adults. In addition, the influence of gender was more pronounced among female participants. This effect was significant in a combined analysis of the gender blocks of Experiments 1 and 2 ($t(62)=2.56$, $p<.05$, $d=.66$), and is consistent with some prior reports of greater sensitivity by girls to gender at three years of age (e.g., Yee & Brown, 1994; although see La Freniere et al., 1984 and Lobel & Menashri, 1993). Nevertheless, both boys and girls chose same-gender objects reliably ($M_{\text{boys}}=60.94\%$, $SD=21.00$, $t(31)=2.95$, $p<.01$, $d=.52$; $M_{\text{girls}}=74.22\%$, $SD=20.56$, $t(31)=6.66$, $p<.01$, $d=1.18$).

The children in Experiment 2 also chose objects and activities endorsed by children over those endorsed by adults. This finding accords with evidence for effects of peers on children's preferences (e.g., Birch, 1980; Hendy & Raudenbush, 2000; Kornhaber & Schroeder, 1975). Although children understand that adults are often reliable sources of factual information (e.g., Taylor et al., 1991), they are more apt to use peers as informants in the domain of object preferences.

Experiment 2 revealed an interesting interaction between the categories of gender and age: Both boys and girls were more likely to choose an object liked by a peer when the two endorsers were male (i.e., a boy vs. an adult male) compared to when the two endorsers were female (i.e., a girl vs. an adult female). Children's positivity toward adult females (e.g., Quinn, Yahr, Kuhn, Slater, & Pascalis, 2002; Ramsey et al., 2005) may have competed with their trust in a peer's opinion, thereby attenuating children's reliance on peers over adults on age trials that featured females.

In justifying their own choices, three children appealed to the gender or age of an endorser, indicating an awareness of some social influence on their decision. Nevertheless, 88% of children's responses made no appeal to the endorsers or their social categories. Effects of age and gender therefore may not depend on children's explicit reasoning about social category effects on their own preferences, although it is possible that children's verbal explanations fail to capture the relevant aspects of their reasoning.

General Discussion

In two experiments, three-year-old children's choices of objects were influenced by the gender and age of other people who endorsed them. In Experiment 1, children chose objects endorsed by same-gender peers over those endorsed by other-gender peers. In Experiment 2, children preferred objects and actions whose endorsers matched them in gender or age. Children attended to the gender and age of the informants, even in the absence of category labels or informative names or pronouns, and even though children could have based their

decisions on the visual appeal of the different objects. Interestingly, children rarely appealed to gender or age categories in explaining their preferences. Thus, gender and age categories appear to influence children's choices in ways that children fail to express explicitly. As is the case for adults (Nisbett & Wilson, 1977), children's preferences may be influenced by properties of others even when participants are not explicitly aware of their influence. Alternatively, children may be aware of the influence of gender but fail to express this awareness when asked to justify their choices.

While three-year-old children clearly relied on others' gender and age to determine their own preferences for objects, performance on race trials in our task was less reliable. Numerous studies provide evidence that by 4–5 years of age, children attend to race when classifying, evaluating, and reasoning about other individuals in a variety of tasks and contexts (for reviews, see Aboud, 1988; Aboud & Skerry, 1984; Bigler & Liben, 2006; Levy & Killen, 2008; Hirschfeld, 1996; Quintana & McKown, 2008). Nevertheless, research on younger children's race-based reasoning and preferences is relatively sparse and shows less clear patterns of results. For example, in a study of children aged 3–5 years, Kircher & Furby (1971) found that only 4- and 5-year-old children showed reliable preferences based on race information. Moreover, though observations of children's friendship preferences reveal that elementary school-age children have more same-race than other-race friends (e.g., Aboud, Mendelson, & Purdy, 2003; Finkelstein & Haskins, 1983; Howes & Wu, 1990), similar patterns have not been consistently observed in younger children (e.g., Fishbein & Imai, 1993; Stevenson & Stevenson, 1960).

The results from the present work suggest that three-year-old children do not consistently use others' race to guide their own preferences for novel items. Children performed at chance on race trials with foods and games. Although children did use race on trials with toys and clothing, overall they were markedly less affected by race than by gender. Nevertheless, the analyses of property effects suggest that children use race to guide their choices of some objects and activities more than others. Future studies could explore the potentially important interactions between object types and different social categories. It would be especially interesting to investigate whether children show stronger social category effects for properties and activities that are highly conventional (such as style of dress) than for properties that are more biologically constrained (such as eating).

Although three-year-old children did not consistently view others' race as a particularly meaningful guide to object preferences, it is likely that older children would show a different performance profile. Bennett and Sani (2003), for example, found that five-year-old children spontaneously encoded both gender and race when learning about others' object preferences. Moreover, the children in our sample were White and from fairly homogenous environments. Future studies should examine minority-group children's responses, as well as behavior of majority-group children from more and less homogenous environments, in order to probe the role of identity and exposure in the development of young children's use of race information when deciding about their own preferences. Studies of older children suggest that the racial and ethnic make-up of one's environment can affect a host of attitudes in older children (e.g., McGlothlin & Killen, 2005; 2006; McGlothlin, Killen, & Edmonds, 2005); young children may be similarly affected by the composition of their early social environments.

The present findings mesh with the findings from studies of adults. Although adults encode age, gender, and race spontaneously in many contexts, age and gender may be more resilient attributes than race (Cosmides, Tooby, & Kurzban, 2003). In a study using the memory confusion protocol (Taylor, Fiske, Etoff, & Ruderman, 1978), for example, Kurzban and colleagues found that participants' encoding of race information was markedly reduced

when individuals were shown to be members of coalitional alliances that were uncorrelated with race. In the study, participants first saw sentences uttered by Black and White men from two different coalitions; each coalition was comprised of different Black and White men, and coalition membership was indicated by t-shirt color, as well as by statements of allegiance to the t-shirt group. At test, when participants were asked to recall who said what, participants were more likely to confuse sentences uttered by members of the same t-shirt group than they were to confuse sentences uttered by members of the same racial group, demonstrating more robust encoding of coalition membership than racial group membership. In contrast, after viewing sentences and photos paired with women and men from different coalitions, participants were equally and highly likely to make errors along gender and coalition lines (Kurzban, Cosmides, & Tooby, 2001).

The findings raise questions for future research on the development of children's social categories, social learning, and object preferences. First, further studies are needed to probe the reasons why children base their own choices on the preferences of other individuals. One possibility is that children's choices are guided by the assumption that they share preferences with other members of the same social category (e.g., "We are both girls, she likes Spoodle, and so I will probably like it too") (see also Martin, 2000; Martin & Halverson, 1981). Consistent with this possibility, children infer that individuals from a common social category share properties in common when categories are explicitly labeled (e.g., Diesendruck & haLevi, 2006; Gelman et al., 1986; Taylor & Gelman, 1993). The present findings thus raise the possibility that children make inferences about shared preferences between themselves and individuals from the same social category, even in the absence of labeling. Alternatively, or in addition, children's choices may be driven by social preferences for same-gender and same-age individuals that propagate from the endorsers themselves to the objects and activities that they endorse (e.g., "I like girls, this girl likes Spoodle, so I will probably like it too."). Children's failure to appeal to social categories in justifying their choices might seem to cast doubt on both of these accounts, but it does not exclude them: Children may reason about social category relationships in making their choices, but they may fail to remember or articulate their reasoning after their choices are made.

A second, related question concerns the relation of the present findings to children's developing conception of their own identity. It is possible that children gravitate toward the preferences and behaviors of same-age and same-gender individuals prior to achieving any explicit understanding of themselves and others as members of particular social groups (e.g., Bussey & Bandura, 1999). Alternatively, children's use of social categories to guide preferences may depend on an explicit conception of themselves and others as members of particular social categories. In the case of gender, for example, Martin and colleagues (e.g., Martin & Halverson, 1981) have proposed that children's ability to recognize their own and others' gender identity and category membership motivates children to preferentially interact with, attend to, and learn from same-gender individuals. Consistent with this perspective, children's ability to identify their own or others' gender is related to increased sex-typed preferences, and children's behavior with novel objects is influenced by gender labeling of other children who interact with those objects (for review, see Martin, Ruble, & Skzkrybalo, 2002). Further research is needed, however, to elucidate the interrelationships among children's developing gender, race, and age identities and their spontaneous vs. conscious use of social category information when evaluating novel objects and activities.

A third question concerns children's developing conceptions of race: why does race fail to serve as a consistent and reliable guide to object and activity choices of three-year-old children, given that it influences the looking preferences of infants (Bar-Haim et al., 2006; Kelly et al., 2005)? One possibility is that the looking preferences of infants do not reflect true social preferences: infants may look longer at same-race faces because they are more

familiar and easier to process, not because they depict individuals whom the infants evaluate more positively. Alternatively, positive social preferences for same-race individuals may trace back to infancy, but they may fail to guide young children's choices among objects and actions. Additional research on the object preferences of infants, and on the direct social preferences of very young children, are needed to distinguish these possibilities.

Further questions concern the processes at work in the present task. First, in evaluating novel objects, are children attracted to items endorsed by in-group members, avoidant of items endorsed by out-group members, or are both processes at work in guiding children's preferences? Second, to what extent do the effects observed in these studies depend on a method in which children are presented with a direct contrast between members of two different social categories with different preferences (e.g., a boy who likes one toy *versus* a girl who likes a different toy)? Although use of this procedure did not produce a consistent effect of race on children's choices, the procedure nevertheless may have highlighted that object and activity preferences were linked to social categories, rather than simply to individuals. Indeed, when two individuals from different animal or human social categories are shown to have contrasting biological or psychological properties, children and adults are likely to view those properties as stable and generalizable to other category members (Kalish & Lawson, 2007; Prentice & Miller, 2006; Rhodes & Gelman, 2008). Future studies could explore these questions by examining children's preferences for items endorsed by people presented in isolation, and by comparing children's preferences for items associated with in-group and out-group members to items that are not associated with members of any particular social category.

Finally, why do gender and age have more influence than race on children's preferences? Young children may focus on gender and age because of their evolutionary importance (e.g., Cosmides et al., 2003). Alternatively, or in addition, children may attend to gender and age because their social environments mark these distinctions more clearly. Adults may promote children's gender categorization through the use of gender-specific pronouns and proper names, and by encouraging social interactions within these categories (e.g., Arthur, Bigler, Liben, Gelman, & Ruble, 2008; Gelman, Taylor, & Nguyen, 2004). Studies of young infants may begin to distinguish these possibilities. If young infants show social preferences based on gender and age, despite minimal experience in the social world, this would suggest that children may be predisposed to categorize and prefer individuals according to their gender and age. If, however, social category-based preferences are not evident until the toddler or preschool years, and are correlated with adults' labeling or promotion of the categories, this would suggest a stronger role of the social environment in guiding the development social categories.

Regardless of the origins of social categories and preferences, the present research provides evidence that three-year-old children are influenced by the preferences and actions of people around them, even when the people are unknown to them and express preferences that receive no validation from known adults. An early-developing mechanism for privileging the opinions of other people of the child's gender and age may have implications for the development of preferences outside the domains of learning explored in the present studies. It is possible, for example, that young children's spontaneous orienting toward same-sex peers will influence the development of personality, skills, beliefs, values, and even career choices. Important phenomena of social identity and social stratification therefore may be illuminated by studies of early social cognitive development.

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References

- About, F. Children and prejudice. Basil Blackwell; Cambridge, MA: 1988.
- About F, Mendelson MJ, Purdy KT. Cross-race peer relations and friendship quality. *International Journal of Behavioral Development*. 2003; 27:165–173.
- About F, Skerry FE. The development of ethnic attitudes: A critical review. *Journal of Cross-Cultural Psychology*. 1984; 15:3–34.
- Albert AA, Porter JR. Age patterns in the development of children's gender-role stereotypes. *Sex Roles*. 1983; 9:59–67.
- Arthur, AE.; Bigler, RS.; Liben, LS.; Gelman, SA.; Ruble, DN. Gender stereotyping and prejudice in young children: A developmental intergroup perspective.. In: Levy, S.; Killen, M., editors. *Intergroup relations: An integrative developmental and social psychological perspective*. Psychology Press; Philadelphia, PA: 2008.
- Bandura A. Influence of models' reinforcement contingencies on the acquisition of imitative responses. *Journal of Personality and Social Psychology*. 1965; 1:589–595. [PubMed: 14300234]
- Bar-Haim Y, Ziv T, Lamy D, Hodes R. Nature and nurture in own-race face processing. *Psychological Science*. 2006; 17:159–163. [PubMed: 16466424]
- Bauer PJ, Coyne MJ. When the name says it all: Preschoolers' recognition and use of the gendered nature of common proper names. *Social Development*. 1997; 6:271–291.
- Bennett M, Sani F. The role of target gender and race in children's encoding of category-neutral person information. *British Journal of Developmental Psychology*. 2003; 21:99–112.
- Bigler RS, Liben LS. A cognitive-developmental approach to racial stereotyping and reconstructive memory in Euro-American children. *Child Development*. 1993; 64:1507–1518.
- Bigler, RS.; Liben, LS. A developmental intergroup theory of social stereotypes and prejudice.. In: Kail, RV., editor. *Advances in child development and behavior*. Vol. 34. Elsevier; San Diego: 2006. p. 39-89.
- Birch LL. Effects of peer models' food choices and eating behaviors on preschoolers' food preferences. *Child Development*. 1980; 51:489–496.
- Bradbard MR, Endsley RC. The effects of sex-typed labeling on preschool children's information-seeking and retention. *Sex Roles*. 1983; 9:247–260.
- Bradbard MR, Martin CL, Endsley RC, Halverson CF. Influence of sex stereotypes on children exploration and memory: A competence versus performance distinction. *Developmental Psychology*. 1986; 22:481–486.
- Brewer, MB. A dual process model of impression formation.. In: Wyer, RS.; Srull, TK., editors. *Advances in social cognition*. Vol. 1. Lawrence Erlbaum Associates; Hillsdale, NJ: 1988. p. 1-36.
- Brock TC. Communicator-recipient similarity and decision change. *Journal of Personality and Social Psychology*. 1965; 1:650–654. [PubMed: 14300242]
- Brooks J, Lewis M. Infants' responses to strangers: Midget, adult, and child. *Child Development*. 1976; 47:323–332. [PubMed: 1269305]
- Bussey K, Bandura A. Influence of gender constancy and social power on sex-linked modeling. *Journal of Personality and Social Psychology*. 1984; 47:1292–1302. [PubMed: 6527216]
- Bussey K, Bandura A. Social cognitive theories of gender development and differentiation. *Psychological Review*. 1999; 106:676–713. [PubMed: 10560326]
- Cosmides L, Tooby J, Kurzban R. Perceptions of race. *Trends in Cognitive Sciences*. 2003; 7:173–178. [PubMed: 12691766]
- Csibra, G.; Gergely, G. Social learning and social cognition: The case for pedagogy.. In: Munakata, Y.; Johnson, MH., editors. *Processes of Change in Brain and Cognitive Development*. Attention and Performance XXI. Oxford University Press; Oxford: 2006. p. 249-274.

- Diesendruck G, Levi H. The role of language, appearance, and culture in children's social category-based induction. *Child Development*. 2006; 77:539–553. [PubMed: 16686787]
- Drumme AB, Newcombe NS. Developmental changes in source memory. *Developmental Science*. 2002; 5:502–513.
- Finkelstein NW, Haskins R. Kindergarten children prefer same-color peers. *Child Development*. 1983; 54:502–508.
- Fishbein HD, Imai S. Preschoolers select playmates on the basis of gender and race. *Journal of Applied Developmental Psychology*. 1993; 14:303–316.
- Fiske, ST. Stereotyping, prejudice, and discrimination. In: Gilbert, DT.; Fiske, ST.; Lindzey, G., editors. *The handbook of social psychology*. McGraw-Hill; Boston, MA: 1998. p. 357-411.
- French DC. Children's social interaction with older, younger, and same-age peers. *Journal of Social and Personal Relationships*. 1987; 4:63–86.
- Gelman SA, Collman P, Maccoby EE. Inferring properties from categories versus inferring categories from properties: The case of gender. *Child Development*. 1986; 57:396–404.
- Gelman, SA.; Taylor, MG.; Nguyen, SP. *Monographs of the Society for Research in Child Development*. Vol. 69. Blackwell Publishing; 2004. Mother-child conversations about gender: Understanding the acquisition of essentialist beliefs.
- Hendy HM, Raudenbush B. Effectiveness of teacher modeling to encourage food acceptance in preschool children. *Appetite*. 2000; 34:61–76. [PubMed: 10744893]
- Hirschfeld, LA. *Race in the making: Cognition, culture, and the child's construction of human kinds*. MIT Press; Cambridge, MA: 1996.
- Hirschfeld LA, Gelman SA. What young children think about the relationship between language variation and social difference. *Cognitive Development*. 1997; 12:213–238.
- Howes C, Wu F. Peer interactions and friendships in an ethnically diverse school setting. *Child Development*. 1990; 61:537–541. [PubMed: 2344788]
- Kalish CW, Lawson CA. Negative evidence and inductive generalization. *Thinking & Reasoning*. 2007; 13:394–425.
- Kelly DJ, Quinn PC, Slater AM, Lee K, Gibson A, Smith M, Ge L, Pascalis O. Three-month-olds, but not newborns, prefer own-race faces. *Developmental Science*. 2005; 8:F31–F36. [PubMed: 16246233]
- Kircher M, Furby L. Racial preferences in young children. *Child Development*. 1971; 42:2076–2078.
- Kornhaber RC, Schroeder WP. Importance of model similarity on extinction of avoidance behavior in children. *Journal of Consulting and Clinical Psychology*. 1975; 43:601–607. [PubMed: 1236876]
- Kowalski K, Lo Y-F. The influence of perceptual features, ethnic labels, and sociocultural information on the development of ethnic/racial bias in young children. *Journal of Cross-Cultural Psychology*. 2001; 32:444–455.
- Kuhn D, Nash SC, Brucken L. Sex role concepts of two- and three-year-olds. *Child Development*. 1978; 49:445–451. [PubMed: 679779]
- Kurzban R, Tooby J, Cosmides L. Can race be erased? Coalitional computation and social categorization. *Proceedings of the National Academy of Sciences*. 2001; 98:15387–15392.
- La Freniere P, Strayer FF, Gauthier R. The emergence of same-sex affiliative preferences among preschool peers: A developmental/ethological perspective. *Child Development*. 1984; 55:1958–1965.
- Leinbach MD, Hort BE, Fagot BI. Bears are for boys: Metaphorical associations in young children's gender stereotypes. *Cognitive Development*. 1997; 12:107–130.
- Levy, S.; Killen, M. *Intergroup Relations: An Integrative Developmental and Social Psychological Perspective*. Psychology Press; Philadelphia, PA: 2008.
- Lobel T, Menashri J. Relations of conceptions of gender-role transgressions and gender constancy to gender-typed toy preferences. *Developmental Psychology*. 1993; 29:150–155.
- Maccoby, EE.; Jacklin, CN. Gender segregation in childhood. In: Reese, EH., editor. *Advances in child development and behavior*. Vol. 20. Academic Press; New York: 1987. p. 239-287.
- Martin CL. Children's use of gender-related information in making social judgments. *Developmental Psychology*. 1989; 25:80–88.

- Martin, CL. Cognitive theories of gender development.. In: Eckes, T.; Trautner, HM., editors. The developmental social psychology of gender. Lawrence Erlbaum; 2000. p. 91-122.
- Martin CL, Eisenbud L, Rose H. Children's gender-based reasoning about toys. *Child Development*. 1995; 66:1453–1471. [PubMed: 7555224]
- Martin CL, Fabes RA. The stability and consequences of young children's same-sex peer interactions. *Developmental Psychology*. 2001; 37:431–446. [PubMed: 11370917]
- Martin CL, Fabes RA, Evans SM, Wyman H. Social cognition on the playground: Children's beliefs about playing with girls versus boys and their relations to sex segregated play. *Journal of Social and Personal Relationships*. 1999; 16:751–771.
- Martin CL, Halverson CF. A schematic processing model of sex typing and stereotyping in children. *Child Development*. 1981; 52:1119–1134.
- Martin CL, Little JK. The relation of gender understanding to children's sex-typed preferences and gender stereotypes. *Child Development*. 1990; 61:1427–1439. [PubMed: 2245735]
- Martin CL, Ruble DN, Szkrybalo J. Cognitive theories of early gender development. *Psychological Bulletin*. 2002; 128:903–933. [PubMed: 12405137]
- Masters JC, Ford ME, Arend R, Grotevant HD, Clark LV. Modeling and labeling as integrated determinants of children's sex-typed imitative behavior. *Child Development*. 1979; 50:364–371.
- McGlothlin H, Killen M. Children's perceptions of intergroup and intragroup similarity and the role of social experience. *Developmental Psychology*. 2005; 26:680–698.
- McGlothlin H, Killen M. Intergroup attitudes of European American children attending ethnically homogenous schools. *Child Development*. 2006; 77:1375–1386. [PubMed: 16999805]
- McGlothlin H, Killen M, Edmonds C. European-American children's intergroup attitudes about peer relationships. *British Journal of Developmental Psychology*. 2005; 23:227–249.
- Neely LA, Jaswal VK. Adults don't always know best: Preschoolers use past reliability over age when learning new words. *Psychological Science*. 2006; 17:757–758. [PubMed: 16984291]
- Nisbett RE, Wilson TD. The halo effect: Evidence from unconscious alteration of judgments. *Journal of Personality and Social Psychology*. 1977; 35:250–256.
- Patterson MM, Bigler RS. Preschool children's attention to environmental messages about groups: Social categorization and the origins of intergroup bias. *Child Development*. 2006; 77:847–860. [PubMed: 16942493]
- Perry DG, Bussey K. The social learning theory of sex differences: Imitation is alive and well. *Journal of Personality and Social Psychology*. 1979; 37:1699–1712.
- Prentice DA, Miller DT. Essentializing differences between women and men. *Psychological Science*. 2006; 17:129–135. [PubMed: 16466420]
- Quinn PC, Yahr J, Kuhn A, Slater A, Pascalis O. Representation of the gender of human faces by infants: a preference for female. *Perception*. 2002; 31:1109–1121. [PubMed: 12375875]
- Quintana, SM.; McKown, C. *Handbook of race, racism, and the developing child*. John Wiley & Sons; Hoboken, NJ: 2008.
- Ramsey JL, Langlois JH, Marti NC. Infant categorization of faces: Ladies first. *Developmental Review*. 2005; 25:212–246.
- Reis HT, Wright S. Knowledge of sex-role stereotypes in children aged 3 to 5. *Sex Roles*. 1982; 8:1049–1056.
- Rhodes M, Gelman SA. Categories influence predictions about individual consistency. *Child Development*. 2008; 79:1270–1287. [PubMed: 18826525]
- Ruble DN, Balaban T, Cooper J. Gender constancy and the effects of sex-typed televised toy commercials. *Child Development*. 1981; 52:667–673. [PubMed: 7249827]
- Ruble, DN.; Martin, CL.; Berenbaum, SA. Gender development.. In: Damon, W.; Eisenberg, N., editors. *Handbook of child psychology*. 6th ed.. Vol. 3. Wiley; New York: 2006. p. 858-931.
- Ryu G, Park J, Feick L. The role of product type and country-of-origin in decisions about choice of endorser ethnicity in advertising. *Psychology & Marketing*. 2006; 23:487–513.
- Stangor C, Lynch L, Duan C, Glass B. Categorization of individuals on the basis of multiple social features. *Journal of Personality and Social Psychology*. 1992; 62:207–218.

- Somerville JA, Hammond AJ. Treating another's actions as one's own: Children's memory of and learning from joint activity. *Developmental Psychology*. 2007; 43:1003–1018. [PubMed: 17605531]
- Stevenson HW, Stevenson NG. Social interaction in an interracial nursery school. *Genetic Psychology Monographs*. 1960; 61:37–75. [PubMed: 13834555]
- Stotland EU, Zander A, Natsoulas T. Generalization of interpersonal similarity. *Journal of Abnormal & Social Psychology*. 1961; 62:250–256.
- Tajfel H, Billig MG, Bundy RP, Flament C. Social categorization and intergroup behavior. *European Journal of Social Psychology*. 1971; 1:149–178.
- Taylor M, Cartwright BS, Bowden T. Perspective taking and theory of mind: Do children predict interpretive diversity as a function of differences in observers' knowledge? *Child Development*. 1991; 62:1334–1351. [PubMed: 1786719]
- Taylor SI, Fiske ST, Etcoff NL, Ruderman AJ. Categorical bases of person memory and stereotyping. *Journal of Personality and Social Psychology*. 1978; 36:778–793.
- Taylor MG, Gelman SA. Children's gender- and age-based categorization in similarity and induction tasks. *Social Development*. 1993; 2:104–121.
- Tomasello M, Kruger A, Ratner H. Cultural learning. *Behavioral and Brain Sciences*. 1993; 16:495–552.
- VanderBorghet M, Jaswal VK. Who knows best? Preschoolers sometimes prefer child information over adult informants. *Infant and Child Development*. 2009; 18:61–71. [PubMed: 20047013]
- Whittler TE, DiMeo J. Viewers' reactions to racial cues in advertising stimuli. *Journal of Advertising Research*. 1991; 31:37–46.
- Yee M, Brown R. The development of gender differentiation in young children. *British Journal of Social Psychology*. 1994; 33:183–196. [PubMed: 8044502]

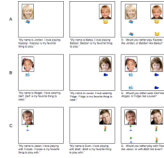


Figure 1.

(A) An example gender trial featuring two novel games. (B) An example race trial featuring two novel items of clothing. (C) An example age trial featuring two novel toys. In the experiments, all four types of items (games, clothing, toys, food) were used on all three kinds of trials (gender, race, age)

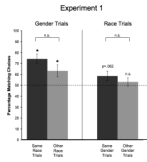


Figure 2. Results from gender and race trials in Experiment 1. Asterisks indicate bars that are significantly different from chance. Error bars indicate standard error.

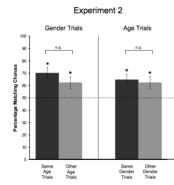


Figure 3. Results from gender and age trials in Experiment 2. Asterisks indicate bars that are significantly different from chance. Error bars indicate standard error.