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Children's Beliefs in Reciprocation of Biases and Flexibility

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Abstract

Children display positive and negative biases based on peers' attractiveness, gender, and race, but it is unclear whether children who associate positive attributes with certain peers also believe those peers think positively of them. In each domain (attractiveness, gender, race), we measured 3- to 11-year-olds' ($N=102$) biases and flexibility and their beliefs in reciprocity of bias and flexibility by asking who would think positively of them. Children could choose one of two unfamiliar peers (forced choice assessment) or had the additional options of choosing both or neither peer (non-forced choice assessment). We found children often displayed beliefs in reciprocation, with beliefs in positive bias reciprocation from attractive girls showing the largest effect sizes. These beliefs significantly correlated with and were predictive of children's positive and negative biases and flexibility. The duality of children's beliefs may contribute to strengthening their biases and segregating social groups.

Keywords

attractiveness; gender; race; bias; flexibility; reciprocation

As young as 3–4 years of age, children display positive and negative biases based on a person's attractiveness, gender, and race (e.g., Bigler & Liben, 1993; Dion, 1973; Powlishta, 1995). Although peers, parents, teachers, books, and the media can all contribute to developing these biases (e.g., Baker-Sperry, 2007; Cristofaro & Tamis-LeMonda, 2008; Hilliard & Liben, 2010; Li-Vollmer, 2002; McGlothlin & Killen, 2010), developmental intergroup theory proposes that children play a constructive role in developing their beliefs and attitudes toward social groups in each of these domains (Bigler & Liben, 2006). Evidence for development of these constructivist beliefs and attitudes is quite strong based on studies assessing children's biases in tasks involving actual and novel social groups (e.g.,

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Bigler, 1995), but it is unclear whether children also construct beliefs about the reciprocity of these biases. In other words, if children typically associate positive attributes with high attractive, same-sex, or majority race peers (Dion, 1973; Powlishta, 1995; Williams, Best, & Boswell, 1975), do they also believe that these same peers are likely to think positively of them? To our knowledge, no one has assessed such reciprocity in biases, but clearly children think positively of certain peers based on their attractiveness, gender, and race (e.g., Katz & Kofkin, 1997; Langlois & Stephan, 1977; Martin, 1989) and may believe that those positive attributions are reciprocated. This study sought to investigate this possibility in these three domains.

If children differentially assign positive and negative attributes to members of different social groups and believe in positive attribute reciprocation from particular social group members, this duality of beliefs may contribute to strengthening and maintaining their biases. Beliefs about positive attribute reciprocation may also contribute to group segregation. There is evidence in the gender domain that pre-adolescent and adolescent children have differential beliefs regarding their efficacy in interacting with same-sex and other-sex peers. The lower their beliefs in other-sex interaction efficacy, the less they thought they would be included in other-sex groups and the less other-sex friendships they had (Zosuls, Field, Martin, Andrews, & England, 2014). These differential perceptions may stem from not only forming positive biases for their ingroup earlier in development (Powlishta, 1995), but also from forming early beliefs that an ingroup member would think more positively of them than an outgroup member.

The proposal that children should believe in positive attribute reciprocation stems from social projection theory, which states that individuals believe that others will respond in a similar manner, particularly others from the same social group (Robbins & Krueger, 2005). Children as young as 5- to 6-years-old can reliably answer how others of the same ethnicity, a different liked ethnicity, or an arbitrarily created ingroup or outgroup feel about same and different group members (Aboud & Mitchell, 1977; Abrams, 2011; Augostinos & Rosewarne, 2001). To our knowledge, however, no one has examined children's responses to such questions in which the target is oneself. Based on the social projection framework and relevant developmental literature, however, we predicted children would believe that a peer they viewed positively would reciprocate such beliefs, *positive bias reciprocation*.

The bias individuals display is impacted by the situation (Biernat, 2003), such as whether there are limits on the behavior or decision being made (e.g., only one peer can be chosen) or no limits (e.g., more than one peer can be chosen). Such differences are apparent when assessing children's bias in forced choice compared with non-forced choice tasks, respectively (Augostinos & Rosewarne, 2001; Doyle, Beaudet & Aboud, 1988; Powlishta, Serbin, Doyle, & White, 1994; Serbin & Sprafkin, 1986), and could potentially manifest when assessing children's beliefs in positive bias reciprocation. We, therefore, included both forms of assessment in our study.

The two types of assessments can elicit differential responses because non-forced choice methods permit children to display flexibility—an understanding that members of different social groups can possess similar attributes (Powlishta et al., 1994; Serbin & Sprafkin,

1986). Social projection theory proposes that individuals believe others will respond similarly (Robbins & Krueger, 2005), so it is plausible that children who show flexibility believe others will display such flexibility, regardless of social group membership. We, therefore, examined whether children who showed flexible thinking in their assignment of positive attributes to peers from two different social groups also believed both peers would reciprocate those attributions, *positive flexibility reciprocation*.

To measure children's beliefs in positive bias reciprocation and positive flexibility reciprocation and determine whether those beliefs were related to their biases and flexibility, we had 3- to 11-year-olds assign positive and negative attributes to unfamiliar peers differing in attractiveness (high and low), gender (female and male), and race (African American and European American). Children participated in either a forced choice assessment in which they had to choose one of two pictured peers to answer the questions or a non-forced choice assessment in which they had the additional options of choosing both or neither peer. To assess positive bias reciprocation and positive flexibility reciprocation, we asked children to nominate peers who would think positively of them. Children's choice of one of the two peers in either the forced choice or non-forced choice assessment would indicate positive bias reciprocation, whereas children's choice of both peers in the non-forced choice assessment would indicate positive flexibility reciprocation. We included only positive traits to avoid children thinking about someone who perceived them negatively. The ages tested included children who were of the same age and also younger than those tested in studies assessing children's beliefs about others' attributions (Aboud & Mitchell, 1977; Abrams, 2011; Augostinos & Rosewarne, 2001), so we could investigate age differences in children's manifestation of such beliefs.

Because children typically believe ingroup or liked group members will evaluate other ingroup or liked members positively (Aboud & Mitchell, 1977; Abrams, 2011; Augostinos & Rosewarne, 2001), we expected children would display beliefs in reciprocation of positive attributes for members of liked groups. Higher status and majority group members display more consistent liking for their ingroup than lower status and minority group members (e.g., Aboud & Mitchell, 1977; Shutts, Kinzler, Katz, Tredoux, & Spelke, 2011), so these effects might be less robust for minority race children in the race domain. Moreover, there should be moderate to high correlations between children's biases or flexibility and their belief in positive bias reciprocation or positive flexibility reciprocation, respectively, within a particular domain. Children's biases in the three domains are domain-specific: Although children show biases based on attractiveness, gender, and race, these biases do not correlate across domains (Powlishta et al., 1994; Rennels & Langlois, 2014). We therefore expected that children's beliefs in positive bias reciprocation would be evident in each domain, but would be unrelated across domains. In contrast, children's displays of flexible thinking tend to be domain-general. Children who show flexibility in one domain tend to show flexibility in other domains (Powlishta et al., 1994; Rennels & Langlois, 2014). We therefore expected that children's beliefs in positive flexibility reciprocation would correlate across domains. Last, we expected beliefs in positive bias reciprocation or positive flexibility reciprocation to contribute unique variance in predicting children's bias or flexibility.

Method

Participants

Analyses included data from children ($N = 102$; 52 females) aged 3 years, 4 months to 11 years, 6 months ($M = 6.29$ years, $SD = 2.01$). Other data from these participants are reported elsewhere (references omitted for blind review). Research assistants recruited participants via local schools or sent letters to families, followed up by phone calls. Parents provided consent for their child to participate and children provided verbal assent and written assent (if 7 years of age or older) to participate. School administrators also provided approval for data to be collected at the schools. Parents identified children's race as: 51 European American; 26 mixed race; 19 African American; 4 Asian American; and 2 unreported, with 18 of the children having Spanish, Hispanic, Mexican, or Latino ethnic background. For this study, the European American children were classified as majority race and the mixed race, African American, Asian American, and Latino children were classified as minority race. An additional four children were recruited, but three provided no data because they were too young or chose not to participate, and one child's data could not be used because of perseveration errors on all of the bias tasks.

Materials

Peer images—Facial images included 16 digitized, color photos of 4- to 7-year-olds (four African American boys, four African American girls, four European American boys, and four European American girls) taken from two different university databases. Different racially heterogeneous groups of at least 40 adults, with relatively equal numbers of females and males, rated the faces for attractiveness using a 1–5 Likert Scale ($1 = \text{not very attractive}$; $5 = \text{very attractive}$). There was high interrater agreement ($\alpha s > .90$). Developmental studies commonly use adult ratings of attractiveness to choose stimuli because 3- to 10-year-olds show significant agreement with adults regarding how pretty or handsome a person is (Dion, 1973; Langlois & Stephan, 1977; Styczynski & Langlois, 1977).

Bias tasks—To assess children's biases, we made 16 picture boards (eight for the attractiveness domain and four each for the gender and race domains). Because children view attractiveness as potentially more important for girls than boys (Miller, Lurye, Zosuls, & Ruble, 2009; Ramsey & Langlois, 2002), we examined children's responses to picture boards depicting high and low attractive girls and ones depicting high and low attractive boys, so there were twice as many picture boards for the attractiveness domain. For the attractiveness domain, picture boards depicted two unfamiliar peers who differed in attractiveness, $M = 4.04$, $SD = 0.17$ for high attractive faces, $M = 1.75$, $SD = 0.22$ for low attractive faces, $p < .0001$, but were of the same sex and race (African American boys, African American girls, European American boys, or European American girls). There were no significant differences in ratings for high attractive boys and girls and in ratings for low attractive boys and girls, $p s > .10$.

For the gender domain, the picture boards depicted two unfamiliar peers who differed in sex, but were of the same race and attractiveness (African American boy and girl or European

American boy and girl), $M = 2.76$, $SD = 0.18$ for girls' attractiveness, $M = 2.81$, $SD = 0.13$ for boys' attractiveness, $p = .34$. For the race domain, the picture boards depicted two unfamiliar peers who differed in race, but were of the same sex and attractiveness (African American and European American girls or African American and European American boys), $M = 3.15$, $SD = 0.40$ for African Americans' attractiveness, $M = 3.22$, $SD = 0.45$ for European Americans' attractiveness, $p = .26$.

Eight picture boards assessed forced choices and another eight assessed non-forced choices. Forced choice picture boards contained two separated 3" x 3" laminated facial images of individual children who differed in the domain being assessed, so children's choices for responding were one of the two photos. Non-forced choice picture boards contained these same two photos, but also included two 3" x 6" laminated photographs, one with both children pictured together and one with the children's pictures removed and a large X across the picture. Children's choices for responding were one of the four photos. Different faces were used for each domain. For each picture board, the two children's faces were matched for age, hair color, and emotional expression.

Procedure

We randomly assigned children to participate in the forced choice ($n = 50$, 24 females) or non-forced choice ($n = 52$, 28 females) assessment with the constraint that for each assessment, participants were within the same age range and there were relatively equivalent numbers of females and males and children from different racial groups. To start, a female experimenter (African American or Portuguese) told the child that they would play some games and she would ask some questions. The experimenter stressed that there were no right or wrong answers—she just wanted to know what the child thought. Typically, children individually completed two bias and reciprocal bias tasks during session 1 and the remaining two bias and reciprocal bias tasks during session 2. Because the tasks involved children making attributions based on peers' appearance, the experimenter debriefed children by asking them after the study ended, "What's more important than how a person looks?" and then discussing positive behaviors. The experimenter also asked children what they liked to do, and after the child answered, the experimenter talked about what some of the children pictured in the study liked doing, so the study ended with a focus on behaviors and traits rather than appearance.

Children viewed four picture boards in randomized orders to assess their positive and negative attributions and beliefs in reciprocation of positive attributes. African American and European American children viewed the attractiveness and gender picture boards that matched their own race and children from other racial groups viewed either of the two picture boards relatively equally. Boys and girls viewed the race picture board that matched their sex.

When the experimenter presented each picture board, she asked children to pretend new kids were coming to their school (Dion, 1973). She ensured that children understood how to use each board by asking four pretest questions about cues other than those being measured (e.g., shirt color, hair style/color) before proceeding to the test questions. She then asked eight questions related to four positive and four negative traits and behaviors, "Who do you

think is ____ (e.g., nice/nice to other people, mean/not nice to other people)?" The experimenter requested that the child point to one of the two children (forced choice assessment) or to one of the two children, both children, or neither child (non-forced choice assessment) to answer. Before progressing to the next picture board, children responded to the same four positive traits and behaviors for the beliefs in positive attribute reciprocation questions, "Now I am going to ask you some questions about what these children might think about you. Who would think you are ____?" A different set of positive and negative traits and behaviors was used for each picture board, but sets were randomized across participants, so that questions for each picture board varied, but were counterbalanced, across participants. Table 1 lists the 32 traits and behaviors we used, which were chosen from studies examining attractiveness, gender, or race biases with children ranging in age from 3–12 years (Bigler & Liben, 1993; Dion, 1973; Doyle et al., 1988; Langlois & Stephan, 1977; Powlishta, 1995; Williams, Bennett, & Best, 1975).

Data Preparation

Due to the racial diversity and range of attractiveness of our sample, we could not use attributions to ingroups and outgroups to calculate children's positive and negative attribution biases (Powlishta et al., 1994). Instead, we calculated bias based on children's general tendency to assign more positive attributes to high attractive, same-sex, and majority race peers (peers typically perceived as higher in social status) and more negative attributes to low attractive, other-sex, and minority race peers (peers typically perceived as lower in social status) (Bigler, Averhart, & Liben, 2003; Dion, 1973; Powlishta, 1995; Williams et al., 1975a). Positive attribution biases were calculated by subtracting the percent of positive attributes assigned to lower status peers from the percent assigned to higher status peers. Negative attribution biases were calculated by subtracting the percent of negative attributes assigned to higher status peers from the percent assigned to lower status peers. Beliefs in positive bias reciprocation were calculated by subtracting the percent of positive attributes children thought lower status peers would assign to them from the percent they thought higher status peers would assign to them.

Because we differentiated assignment of positive and negative attributes in our bias scores, we did the same for calculating flexibility. Positive flexibility was calculated by subtracting the percent of positive attributes assigned to neither peer from the percent assigned to both peers. Negative flexibility was calculated by subtracting the percent of negative attributes assigned to neither peer from the percent assigned to both peers. Beliefs in positive flexibility reciprocation were calculated by subtracting the percent of positive attributes children thought neither peer would assign to them from the percent they thought both peers would assign.

Results

We conducted three sets of analyses to answer our research questions. To determine whether children displayed beliefs in positive bias reciprocation or positive flexibility reciprocation, we examined whether these scores differed from chance responding (0) and calculated the effect sizes in each domain. We conducted these analyses for the full sample in each domain

and also separately for majority and minority race children in the race domain to test whether these beliefs are less robust for minority race children as predicted. Next, we examined correlations between children's a) age and the reciprocation measures, b) beliefs in positive bias reciprocation and positive and negative attribution biases, and c) beliefs in positive flexibility reciprocation and positive and negative flexibility to examine whether there were age differences in these beliefs and to determine whether these measures were associated within or across domains, respectively. Last, we determined whether the reciprocation measures contributed unique variance to predicting children's positive and negative bias or their positive and negative flexibility.

Two children included in the analyses had incomplete data. One child in the non-forced choice assessment completed only the gender and race picture boards, so we did not have data regarding the child's biases, flexibility, and beliefs in positive bias reciprocation or positive flexibility reciprocation in the attractiveness domain. Also, a child in the forced choice assessment did not have data for beliefs in positive bias reciprocation in the boy attractiveness domain.

Comparisons to Chance

Positive bias reciprocation—During forced choice assessments, beliefs in positive bias reciprocation significantly differed from chance based on boys' attractiveness and girls' attractiveness, whereas it was marginally significant for gender and non-significant for race. When examining the majority and minority race children separately, the majority race children's beliefs in positive bias reciprocation significantly differed from chance in the race domain. For non-forced choice assessments, beliefs in positive bias reciprocation significantly differed from chance based on girls' attractiveness and gender, whereas it was marginally significant for boys' attractiveness and non-significant for race, regardless of the sample examined. Children's belief in positive bias reciprocation from attractive girls was quite robust as indicated by the large effect sizes in both assessment methods, whereas their belief in positive bias reciprocation from European American peers was a relatively small effect (except for the majority race children in the forced choice assessment) and beliefs in positive bias reciprocation from attractive boys and same-sex peers showed medium to high effect sizes (Table 2).

Positive flexibility reciprocation—Regardless of domain, children showed beliefs in positive flexibility reciprocation that significantly differed from chance responding, although these beliefs were less robust for minority race children in the race domain. Moreover, these effects were quite large in all domains. Children in the non-forced choice assessment, therefore, often believed that both pictured peers would think positively of them (Table 2).

Correlation Analyses

Surprisingly, children's age was unrelated to their beliefs in positive bias reciprocation for both assessment methods and was unrelated to beliefs in positive flexibility reciprocation. Interestingly, however, beliefs in positive bias reciprocation were positively correlated across some domains (boy attractiveness, gender, and race) in the non-forced choice

assessment, but not the forced choice assessment. As predicted, beliefs in positive flexibility reciprocity were positively correlated across all domains (Table 3).

Beliefs in positive bias reciprocity positively correlated with positive and negative attribution biases within each domain, regardless of assessment method (Table 4). Children who displayed positive and negative bias were also likely to believe in reciprocity of positive attributes. Beliefs in positive flexibility reciprocity significantly and positively correlated with positive flexibility in each domain, but correlated with negative flexibility in the gender domain only (Table 4). In each domain, children who thought both peers had positive attributes generally believed both peers would reciprocate those positive attributions. Children who thought neither the boy nor girl in the gender picture boards had negative attributes generally believed both the boy and girl would reciprocate positive attributions.

Beliefs in Reciprocity as a Predictor of Bias and Flexibility

These analyses examined whether beliefs in positive bias reciprocity or positive flexibility reciprocity contributed unique variance to predicting positive and negative attribution biases or positive and negative flexibility, respectively, while accounting for variance contributed by child characteristics (sex, age group [early childhood: 3–6-year-olds, middle childhood: 7–11-year-olds], and race [minority race, majority race]) and bias task characteristics (assessment method, domain). To examine potential interactions between beliefs in positive bias reciprocity or positive flexibility reciprocity and these other factors, we converted beliefs in positive bias reciprocity (PBR) and positive flexibility reciprocity (PFR) to a categorical variable: scores less than 0 were coded as inverse PBR (17% of children) or inverse PFR (15% of children); 0 scores were coded as neutral PBR (40% of children) or neutral PFR (28% of children); scores greater than 0 were coded as high PBR (43% of children) or high PFR (57% of children).

After confirming our data met the assumptions of normality and linearity, we conducted two MANOVAs, one with positive and negative attribution bias as the dependent variables and one with positive and negative flexibility as the dependent variables. The aforementioned child and bias task characteristics served as the independent variables, although assessment method was included as a factor for predicting only biases because flexibility was assessed in the non-forced choice assessment only. PBR was included as a predictor of bias and PFR was a predictor of flexibility. To be conservative, we report the results from Pillai's trace test (Olson, 1976). To decompose main effects and interactions, we conducted univariate analyses of variance and used pairwise comparisons with Sidak adjustments to control for multiple comparisons.

Predicting bias—A preliminary analysis showed no main effects or interactions involving children's sex, so the main analysis collapsed across sex. Results showed a main effect of age group, $F(2, 311) = 3.31, p < .05$, partial $\eta^2 = .02$, domain, $F(6, 624) = 3.22, p < .005$, partial $\eta^2 = .03$, and PBR, $F(4, 624) = 17.60, p < .001$, partial $\eta^2 = .10$. These main effects were superseded by several interactions: an age group x domain interaction, $F(6, 624) = 2.80, p < .05$, partial $\eta^2 = .03$, an age group x PBR interaction, $F(6, 624) = 4.23, p < .005$,

partial $\eta^2 = .03$, a race x assessment method interaction, $F(2, 311) = 8.51, p < .001$, partial $\eta^2 = .05$, a race x domain interaction, $F(6, 624) = 2.66, p < .05$, partial $\eta^2 = .03$, a race x PBR interaction, $F(4, 624) = 4.58, p < .001$, partial $\eta^2 = .03$, an assessment method x PBR interaction, $F(4, 624) = 4.74, p < .001$, partial $\eta^2 = .03$, and an age x race x assessment method x domain x PBR interaction, $F(8, 624) = 2.23, p < .05$, partial $\eta^2 = .03$. Given that our main interest was the role PBR might play in predicting children's bias and that many of the results not involving PBR have been reported elsewhere (references omitted for blind review), we discuss only the results involving PBR. Results not involving PBR are available as supplementary materials. We did not decompose the 5-way interaction because the cell sizes for participants in each group were often as low as 1–3, suggesting results would not be generalizable or meaningful.

The main effect for PBR occurred because children in each PBR group significantly differed in the amount of positive and negative attribution bias they displayed. Neutral PBR children showed significantly less positive and negative attribution bias compared with high PBR children, $ps < .001$. Neutral PBR children showed minimal bias, whereas high PBR children thought more positively of higher status peers and more negatively of lower status peers. Inverse PBR children thought more positively of lower status peers and more negatively of higher status peers compared with neutral PBR or high PBR children, $ps < .001$ (Figure 1).

The age group x PBR interaction occurred for two reasons. First, when examining the effects of PBR within each age group, results were the same as those described regarding the main effect of PBR with one exception. For middle childhood participants, the neutral and inverse PBR groups showed only a marginally significant difference in the positive attribution bias they displayed, $p = .054$. Second, when examining the effects of age within each PBR group, we found that middle childhood participants with high PBR displayed significantly more negative attribution bias than early childhood participants with high PBR, $p < .05$ (Figure 1).

The race x PBR interaction occurred for two reasons. First, when examining the effects of PBR within each race, results were the same as those described regarding the main effect of PBR with one exception. For minority race children, the neutral and inverse PBR groups did not significantly differ in the negative attribution bias they displayed, $p = .19$. Second, when examining the effects of race within each PBR group, we found that majority race participants with neutral PBR displayed significantly more negative attribution bias than minority race participants with neutral PBR, $p < .05$ (Figure 2).

The assessment method x PBR interaction occurred for two reasons. First, when examining the effects of PBR within each assessment method, results were the same as those described regarding the main effect of PBR with one exception. For children in the non-forced choice assessment, the neutral and inverse PBR groups did not significantly differ in the negative attribution bias they displayed, $p = .14$. Second, when examining the effects of assessment method within each PBR group, high PBR children showed significantly more positive and negative attribution biases in the forced choice than non-forced choice conditions, $ps < .001$. Neutral PBR children showed more negative attribution bias in the forced choice than non-forced choice condition, $p < .01$, but their positive attribution bias did not significantly differ

based on assessment. Last, inverse PBR children showed no significant differences in the positive and negative attribution biases they displayed in the two assessments (Figure 3).

To summarize, individual differences in children's beliefs in positive bias reciprocation significantly predicted both their positive and negative attribution biases. Children's age group and race, however, moderated these effects. High PBR children's negative attribution biases were stronger among middle childhood than early childhood participants, and neutral PBR children's negative attribution biases were stronger among majority race than minority race children. We also found that individual differences in PBR beliefs moderated how situational (assessment) differences contributed to the bias children displayed. Children typically show more bias in forced choice than non-forced choice assessments (Augostinos & Rosewarne, 2001; Doyle et al., 1988; Powlishta et al., 1994; Serbin & Sprafkin, 1986), but we found that beliefs in positive bias reciprocation moderated this effect. Compared with high PBR children, assessment method had minimal impact on the biases displayed by inverse PBR children and affected only the negative attribution biases displayed by neutral PBR children.

Predicting flexibility—Results showed a main effect of children's age group, $F(2, 122) = 5.72, p < .005$, partial $\eta^2 = .09$, a main effect of PFR, $F(4, 246) = 3.98, p < .005$, partial $\eta^2 = .06$, and a sex x race x PFR interaction, $F(4, 246) = 3.90, p < .005$, partial $\eta^2 = .06$. Given that our main interest was the role PFR might play in predicting children's flexibility and that the age group effect has been reported elsewhere (references omitted for blind review), we discuss only the results involving PFR. Results regarding the age effect are in the supplementary materials.

The main effect of PFR occurred because high PFR children assigned more positive attributes to both peers (positive flexibility) than neutral PFR or inverse PFR children, $p < .005$, whereas neutral PFR and inverse PFR children did not differ in positive flexibility. High PFR children also showed a marginally significant tendency to assign fewer negative attributes to both peers (negative flexibility) compared with neutral PFR children, $p = .055$, but inverse PFR children did not differ from high PFR and neutral PFR children in the negative flexibility they displayed (Figure 4).

To decompose the sex x race x PFR interaction, we first examined how PFR affected positive and negative flexibility for children based on their sex and race. Only majority race children showed significant differences in flexibility based on PFR. Compared with neutral PFR majority race females, those with high PFR assigned more positive attributes to both peers (positive flexibility), $p < .001$, and fewer negative attributes to both peers (negative flexibility), $p < .05$. Majority race females with inverse PFR showed no significant differences in flexibility compared with high and neutral PFR majority race females. Majority race males showed significant differences in positive flexibility based on PFR, but no differences in negative flexibility based on PFR. High PFR majority race males assigned more positive attributes to both peers (positive flexibility) compared with neutral PFR, $p < .05$, and inverse PFR majority race males, $p < .001$, whereas the latter two PFR groups did not significantly differ in positive flexibility (Figure 5).

We next examined how race affected children's flexibility based on sex and PFR and found only one significant effect among high PFR females' displays of positive flexibility. Majority race females with high PFR assigned more positive attributes to both peers (positive flexibility) compared with minority race high PFR females, $p < .05$.

Last, we examined how sex affected children's flexibility based on race and PFR and found only one significant effect among majority race high PFR children's displays of negative flexibility. Compared with majority race high PFR males, majority race high PFR females assigned significantly fewer negative attributes to both peers (negative flexibility), $p < .05$.

In summary, individual differences in PFR significantly predicted children's flexibility, although PFR more strongly predicted differences in children's displays of positive flexibility than negative flexibility. PFR also appeared to be a more robust predictor of differences in majority race children's flexibility compared with minority race children's flexibility. The lack of some PFR group differences might be due to the inverse PFR children who, despite their inverse beliefs in PFR, rarely showed inverse flexibility. These children also comprised a small percentage of our sample, thus increasing the standard error and making group differences difficult to pinpoint.

Discussion

The purpose of this study was to determine whether children displayed beliefs in positive bias reciprocation or positive flexibility reciprocation and whether such beliefs were related to their positive and negative biases or their positive and negative flexibility in the domains of attractiveness, gender, and race. We found evidence of both types of beliefs among children, even when they were not forced to display positive bias reciprocation in the non-forced choice assessment. Surprisingly, beliefs in positive bias reciprocation and positive flexibility reciprocation were unrelated to children's age. Beliefs in positive bias reciprocation, however, positively correlated with children's positive and negative attribution biases within each domain, and beliefs in positive flexibility reciprocation positively correlated with children's positive flexibility within each domain and negatively correlated with children's negative flexibility in the gender domain. When predicting children's biases, individual differences in beliefs in positive bias reciprocation showed the largest effect size and also interacted with age, race, and assessment method to affect children's biases. Moreover, individual differences in beliefs in positive flexibility reciprocation predicted children's positive flexibility, although these effects were stronger for majority race than minority race children. These results demonstrate that children not only construct beliefs about peers from different social groups, but also construct beliefs regarding how peers from various social groups think about them. It may be useful to attempt to alter biased beliefs in reciprocity as a way of reducing children's biases and their segregation into different social groups.

Theoretical Implications

An important component of developmental intergroup theory is that children actively construct concepts about people in their social world (Bigler & Liben, 2006). This theory emerged from a predominant focus in the developmental literature regarding which social

cues (e.g., attractiveness, gender, race) become psychologically salient to children and how children construct beliefs and affective responses associated with social group members. Our work extends this constructivist view by demonstrating that children also develop beliefs regarding what members from different social groups will think of them. To our knowledge, this is the first study to do so. Such duality in beliefs—believing that certain social group members possess certain attributes and believing that those social group members possess similar opinions—might contribute to children more frequently approaching members of social groups they perceive positively because they believe those individuals are most likely to receive them positively.

Our findings for children's beliefs in positive bias reciprocation fit the predictions of social projection theory (Robbins & Krueger, 2005). Specifically, children who showed liking for certain social group members typically believed those peers would reciprocate the positive attributions. This finding was evident among both high PBR and inverse PBR children with the main difference being that high PBR children believed higher status peers would reciprocate the positive attributions and inverse PBR children believed lower status peers would reciprocate the positive attributions. In addition, neutral PBR children showed no particular liking for higher or lower status peers and subsequently displayed minimal beliefs that certain peers would reciprocate positive attributions.

Not all of the findings for children's beliefs in positive flexibility reciprocation, however, fit the predictions of social projection theory (Robbins & Krueger, 2005). Whereas high PFR and neutral PFR children displayed positive flexibility that was relatively consistent with their beliefs in positive flexibility reciprocation, inverse PFR children did not. Inverse PFR children generally believed neither child would reciprocate positive attributes, yet showed a slight tendency to assign more positive attributes to both peers than neither peer. Although these children comprised a small percentage of our sample, understanding why there is a dissociation in their flexibility beliefs about others and what others would think about them is needed. One possibility is that inverse PFR children are lower in self-esteem compared with high PFR and possibly neutral PFR children. Examining reasons for these potentially important individual differences in social projection is an essential area for future research.

Domain Differences and Similarities

The MANOVA findings showed individual differences in beliefs in positive bias reciprocation were predictive of children's bias in each of the domains. When comparing group beliefs to chance, however, children's beliefs in positive bias reciprocation from high attractive girls showed the largest effect sizes, regardless of assessment method. Children were particularly likely to believe that high attractive girls would think positively of them. Children's relatively pervasive belief in positive bias reciprocation from attractive girls may be because of the stereotypes associated with attractiveness (e.g., Dion, 1973). If children generally believe attractive girls and boys are friendly and nice, and unattractive girls and boys are mean and likely to hit, fight, hurt, or scare others (Dion, 1973, Langlois & Stephan, 1977), then it logically follows that children in our study typically believed attractive peers would think positively of them compared with unattractive peers. The effect sizes may have been larger for beliefs in positive bias reciprocation from attractive girls than attractive boys

because appearance is a cue more strongly linked to girls than boys (Miller et al., 2009; Ramsey & Langlois, 2002). Group beliefs in positive bias reciprocation from high attractive boys and same-sex peers showed moderate to large effects, depending on assessment method.

Group beliefs in positive attribute reciprocation from European American peers typically showed small effects, except for majority race children in the forced choice assessment. These findings fit with our prediction that minority race children's beliefs in positive bias reciprocation would not be as robust as majority race children's beliefs because majority race children often display more consistent liking for their ingroup than minority race children (e.g., Aboud & Mitchell, 1977; Shutts et al., 2011). Majority race children might have shown differential beliefs in positive bias reciprocation in the forced choice and non-forced choice assessment because the former type of assessment is more likely to force them to display bias based on ingroup status. The latter type of assessment likely enabled them to display more socially desirable responding or actual egalitarian beliefs in regard to race (Clark, Hocevar, & Dembo, 1980; Doyle et al., 1988). The area in which the data were collected is racially heterogeneous, so children might have frequent encounters with peers from different racial groups and, on average, develop relatively neutral beliefs in positive bias reciprocation from European American peers.

The domain differences in effect sizes suggest beliefs in positive bias reciprocation are domain-specific as predicted, just as children's displays of positive and negative attribution biases are domain-specific (Powlishta et al., 1994; Rennels & Langlois, 2014). We express some caution in this conclusion, however, because beliefs in positive bias reciprocation were correlated between the domains of boy attractiveness, gender, and race, but not girl attractiveness, in the non-forced choice assessment. This finding may be because beliefs in positive bias reciprocation from attractive girls are relatively common, whereas such beliefs are more selective in these other domains, but when present are relatively consistent (e.g., general belief that higher status peers will reciprocate positive attributes). These correlations were limited to the non-forced choice assessment perhaps because it more accurately assesses children's beliefs in positive bias reciprocation, much like it often provides a better assessment of children's biases than forced choice assessments (e.g., Augustinos & Rosewarne, 2001). Future research should examine predictors of children's beliefs of positive bias reciprocation within and across domains to further examine domain similarities and differences.

Unlike beliefs in positive bias reciprocation, the effect sizes for beliefs in positive flexibility reciprocation were all large and relatively similar across the four domains. Moreover, beliefs in positive flexibility reciprocation were moderately correlated across all domains. Children generally believed that both pictured peers would reciprocate positive attributes regardless of the social group being compared and children who showed these beliefs within one domain tended to display these beliefs in other domains as well. Just as flexibility is considered to be domain-general (Powlishta et al., 1994; Rennels & Langlois, 2014), beliefs in positive flexibility reciprocation also appear to be domain-general.

When examining correlations between positive flexibility and beliefs in positive flexibility reciprocation, there were strong correlations in all domains. Interestingly, however, gender was the only domain in which beliefs in positive flexibility reciprocation were correlated with negative flexibility. Children who believed both male and female peers would think positively of them generally assigned negative attributes to neither the boy nor girl. It would be useful to determine whether beliefs in positive flexibility reciprocation in the gender domain are predictive of children's beliefs in their efficacy in interacting with same- and other-sex peers and actual behaviors when interacting with same- and other-sex peers (Zosuls et al., 2014).

Age Group Differences and Similarities

Age did not significantly correlate with beliefs in positive bias reciprocation, but did interact with beliefs in positive bias reciprocation to predict bias. Specifically, the middle childhood participants with high PBR displayed significantly higher negative attribution biases compared with the early childhood participants with high PBR. Perhaps children's persistence of beliefs that only members of certain social groups will think positively of them as they get older leads to them to primarily engage with those social groups and subsequently increase their negativity toward other social groups.

Surprisingly, age was unrelated to beliefs in positive flexibility reciprocation. Flexible thinking tends to increase with age (Banse et al., 2010; Doyle et al., 1988) and age group was a predictor of children's positive and negative flexibility in our study. Taken together, these findings suggest age might not be as important of an influence on children's beliefs in positive flexibility reciprocation as it is on children's displays of positive and negative flexibility. Given the moderate correlations between children's positive flexibility and their beliefs in positive flexibility reciprocation in each domain, our data suggest it may be possible to increase children's flexible thinking at ages earlier than typically found via increases in their beliefs in positive flexibility reciprocation.

Race Differences

Children's race interacted with beliefs in positive bias reciprocation to predict bias. Although race did not significantly influence the bias that high PBR and inverse PBR children displayed, it did influence the bias displayed by neutral PBR children. Despite displaying relatively neutral beliefs in which social group members would think positively of them, majority race children showed significantly more negative attribution bias than minority race children. Perhaps being in a position of higher social status in terms of race leads these children to believe both higher and lower status peers (across different domains) will equally like them, but they still maintain some slight negativity toward lower status peers.

Children's race and sex interacted with their beliefs in positive flexibility reciprocation to predict their positive and negative flexibility. More specifically, individual differences in PFR were more predictive of differences in majority race children's flexibility, particularly majority race females, compared with minority race children's flexibility. Minority race children have likely encountered discrimination and their cognitive and social development

affects perception of this discrimination (Brown & Bigler, 2005), which could potentially impact their development of flexible thinking and beliefs in positive flexibility reciprocation. For example, some minority children might be hesitant to believe members of different social groups like them due to their cultural awareness of racial stereotypes, social perspective taking skills, and moral reasoning abilities (Brown & Bigler, 2005). Individual differences in said abilities might moderate the relation between minority race children's beliefs in positive flexibility reciprocation and their displays of positive and negative flexibility, and should be assessed in future research.

Assessment Method and Beliefs in Positive Bias Reciprocation

Children typically display more positive bias toward higher status peers and more negative bias toward lower status peers in forced choice than non-forced choice assessments (Banse et al., 2010; Doyle et al., 1988; Serbin & Sprafkin, 1986), but our findings demonstrated that such differential displays varied as a function of children's beliefs in positive bias reciprocation. For example, assessment method mostly affected displays of bias among children with high PBR, but had minimal impact among children with inverse PBR, and influenced neutral PBR children's displays of negative attribution biases only. Situational factors, therefore, influenced children's displays of bias quite differently depending on their beliefs in positive bias reciprocation. It is currently unclear whether the differences in children's judgments based on PBR and situation translate to actual behavioral differences in the bias displayed, but that is an important direction for future research.

Limitations

To our knowledge, this study was the first to investigate whether children display beliefs in positive attribute reciprocation. We found that children's displays of such beliefs were stronger in certain domains than others, but were often present in both forced and non-forced choice assessments. Moreover, these beliefs strongly correlated with bias and flexibility and interacted with other established variables (age group, race, and assessment method) in predicting bias and flexibility, helping to validate this measure. Despite these strengths, our tasks were quite structured; children simply pointed to a picture when responding who they thought would think positively of them. Studies using more open-ended questions could better assess whether children spontaneously provide evidence of such beliefs and why they think that way. Evidence is also needed to determine whether individual differences in beliefs in positive attribute reciprocation are predictive of children acting in a biased or non-biased manner during social interactions. Last, our stimulus faces were closer in age to the early childhood participants than the middle childhood participants. Although use of the same stimuli for different aged children is relatively common in studies examining children's biases (e.g., Bigler & Liben, 1993; Langlois & Stephan, 1977; Pauker et al., 2010), it is important to ensure our results for the older children replicate when tested with same-aged stimulus faces.

Conclusions and Future Directions

Children who show biased responding (whether in the typical or inverse direction) also generally believe that the peers they think positively of will reciprocate such beliefs. This duality of children's beliefs likely contributes to strengthening and maintaining biases,

developing beliefs in efficacy in interacting with other social group members (Zosuls et al., 2014), and segregating into different social groups, but this proposed developmental pathway needs to be investigated. It is critical that interventions aimed at reducing children's biases take this duality of beliefs into account. Studying the qualities of children who display neutral beliefs in positive bias reciprocation may provide insight into how to neutralize other children's biased beliefs. Moreover, it would be useful to understand how early beliefs in positive flexibility reciprocation develop given its lack of association with age in this study, yet important role in predicting flexibility. Finally, it is important to understand why children show individual differences in beliefs in positive attribute reciprocation; discrepancies in self-esteem (Harter, 1998), level of perspective taking (Selman, 1971) and theory of mind (Carpendale & Lewis, 2006) might be possible avenues to explore in future research.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Children generally believe peers they view positively will reciprocate such beliefs.
- Children believed attractive girls would most likely reciprocate positive attributes.
- Beliefs in positive attribute reciprocation were unrelated to age.
- Beliefs in positive attribute reciprocation predicted children's bias & flexibility.

Figure 1. Estimated marginal means of children's biases as a function of their beliefs in positive bias reciprocation (PBR) for the full sample and two age groups. Bars represent standard error.

Figure 2. Estimated marginal means of children's biases as a function of their beliefs in positive bias reciprocation (PBR) and race. Bars represent standard error.

Figure 3.
Estimated marginal means of children's biases as a function of their beliefs in positive bias reciprocation (PBR) and assessment method. Bars represent standard error.

Figure 4.
Estimated marginal means of children's flexibility as a function of their beliefs in positive flexibility reciprocation (PFR). Bars represent standard error.

Figure 5. Estimated marginal means of children's flexibility as a function of their beliefs in positive flexibility reciprocation (PFR) and race and gender. Bars represent standard error.

Table 1

List of Positive and Negative Traits and Behaviors Used in the Bias Tasks

Positive traits/behaviors	Negative traits/behaviors
Good/well-behaved	Bad/does not listen to grown-ups
Friendly/has lots of friends	Unfriendly/does not have many friends
Shares/likes to give people things	Selfish/does not like to share
Clean/keeps their room clean	Messy/dirty/always makes a mess
Strong/has big muscles	Weak/cannot lift heavy things
Fun/likes to have fun	Cries a lot
Adventurous/likes to try new things	Loud/makes a lot of noise
Likes to give hugs	Hits others/gets into fights
Smart/knows a lot of things	Stupid/not very smart
Helpful/helps children when they are sad or hurt	Naughty/does bad things
Wonderful/fantastic	Boring/not fun to play with
Nice/nice to other people	Mean/not nice to other people
Appreciative/always says "thank you"	Crude/says bad words
Independent/can do things by themselves	Dependent/needs other kids to do things for them
Ambitious/works hard	Lazy/lays around a lot
Dominant/tells other kids what to do	Dishonest/tells lies

Table 2

Comparisons of Children's Beliefs in Positive Bias Reciprocation (PBR) and Positive Flexibility Reciprocation (PFR) to Chance in Each Domain

Domain and Measure	Means (Std. Error)	<i>t</i> -test results	Cohen's <i>d</i>
Boy attractiveness PBR			
Forced choice	.34 (.08)	$t(48) = 4.34, p < .001$	1.25
Non-forced choice	.11 (.05)	$t(50) = 1.97, p = .055$	0.56
Girl attractiveness PBR			
Forced choice	.42 (.07)	$t(49) = 6.08, p < .001$	1.74
Non-forced choice	.23 (.05)	$t(50) = 4.57, p < .001$	1.29
Gender PBR			
Forced choice	.16 (.09)	$t(49) = 1.88, p = .066$	0.54
Non-forced choice	.14 (.05)	$t(51) = 2.88, p < .01$	0.81
Race PBR			
Forced choice	.11 (.08)	$t(49) = 1.32, p = .195$	0.38
Minority race kids	-.06 (.13)	$t(23) = -0.50, p = .622$	0.21
Majority race kids	.27 (.10)	$t(25) = 2.57, p < .05$	1.03
Non-forced choice	.07 (.05)	$t(51) = 1.44, p = .156$	0.40
Minority race kids	.08 (.07)	$t(24) = 1.16, p = .256$	0.47
Majority race kids	.07 (.08)	$t(25) = 0.88, p = .388$	0.35
Boy attractiveness PFR			
	.22 (.07)	$t(50) = 3.16, p < .005$	0.89
Girl attractiveness PFR			
	.22 (.06)	$t(50) = 3.53, p < .001$	1.00
Gender PFR			
	.22 (.06)	$t(51) = 3.66, p < .001$	1.03
Race PFR			
	.22 (.06)	$t(51) = 3.61, p < .001$	1.01
Minority race kids	.18 (.09)	$t(24) = 2.04, p = .053$	0.83
Majority race kids	.24 (.08)	$t(25) = 2.83, p < .01$	1.13

Note: Higher scores (possible range = -1 to 1) indicate higher beliefs in PBR or PFR.

Table 3

Pearson r Correlations Between Positive Bias Reciprocation (PBR) or Positive Flexibility Reciprocation (PFR) and Age and Across Domains

<i>Forced choice PBR</i>	1	2	3	4	5
1. Age	-	.02	.00	.02	-.22
2. Boy attractiveness		-	-.20	-.12	.23
3. Girl attractiveness			-	-.15	.12
4. Gender				-	-.05
5. Race					-
<i>Non-forced choice PBR</i>	1	2	3	4	5
1. Age	-	.18	-.07	-.13	-.04
2. Boy attractiveness		-	.26	.38*	.45**
3. Girl attractiveness			-	.23	-.01
4. Gender				-	.37*
5. Race					-
<i>Non-forced choice PFR</i>	1	2	3	4	5
1. Age	-	.13	.28	.22	.10
2. Boy attractiveness		-	.67**	.53**	.48**
3. Girl attractiveness			-	.44**	.46**
4. Gender				-	.47**
5. Race					-

** p .001,

* p .01

Table 4

Correlations between Beliefs in Positive Bias Reciprocation (PBR) and Bias and Between Beliefs in Positive Flexibility Reciprocation (PFR) and Flexibility

PBR - Domain and Assessment Method	Positive attribution bias	Negative attribution bias
Boy attractiveness		
Forced choice assessment	.71 ^{***}	.46 ^{***}
Non-forced choice assessment	.56 ^{***}	.41 ^{**}
Girl attractiveness		
Forced choice assessment	.81 ^{***}	.47 ^{***}
Non-forced choice assessment	.32 [*]	.55 ^{***}
Gender		
Forced choice assessment	.56 ^{***}	.56 ^{***}
Non-forced choice assessment	.39 ^{**}	.44 ^{***}
Race		
Forced choice assessment	.57 ^{***}	.72 ^{***}
Non-forced choice assessment	.56 ^{***}	.37 ^{**}

PFR - Domain	Positive flexibility	Negative flexibility
Boy attractiveness	.55 ^{***}	-.08
Girl attractiveness	.51 ^{***}	.02
Gender	.69 ^{***}	-.35 [*]
Race	.53 ^{***}	-.26

p .001,

**
p .01,

*
p .05