The developmental trajectories of racial and gender intergroup bias in 5- to 10-year-old children: The impact of general psychological tendencies, contextual factors, and individual propensities

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ABSTRACT

Racism and intergroup discrimination are pervasive problems in human societies. Whereas several studies have shown that children show bias in the context of many kinds of groups, much less is known about how and when general psychological tendencies and contextual factors contribute to the manifestation of intergroup bias across development, and whether individual differences play a role. In the present study, we pursue these questions by investigating and comparing the developmental trajectories of intergroup bias in 5- to 10-year-old (mostly) White children ($n = 100$). We assessed children's liking and preferences towards 4 racial groups (White, East Asian, Black, and Middle Eastern) and towards 2 gender groups (male and female) in a within-subject design. We found that the young children in our sample showed a significant racial and gender ingroup bias, speaking to an early and strong manifestation of intergroup bias on the basic ingroup-outgroup distinction. This bias decreased with age. At the same time, we found considerable differences between the different types of outgroups from early on. Furthermore, there were remarkable differences between the developmental trajectories of gender and racial intergroup bias, highlighting the role of both social and contextual influences. Finally, our results did not reveal consistent evidence for the influence of individual differences on children's intergroup bias.

1. Introduction

Racism and intergroup discrimination are pervasive problems in human societies, and myriad studies have shown that the roots of these problems emerge early in childhood. For example, young children show intergroup bias with respect to racial groups (Aboud, 2003), gender groups (Halim et al., 2017), national groups (Barrett et al., 2003), and religious groups (Heiphetz et al., 2013). This intergroup bias, defined here as a relative preference for members of the ingroup over members of the outgroup, can manifest in several different ways, such as attitudes (e.g., positive or negative views of groups), stereotypes (i.e., traits thought to be characteristic of members of different groups), or behavior (e.g., who children chose to be friends with), and has tremendous negative consequences on the individual and societal level.[1]

Previous studies have identified at least two key aspects to explain why humans show intergroup bias in the first place: One part of the phenomenon of intergroup bias appears to be grounded in a general tendency of human psychology, which seems to be geared towards self-categorization and group identification (Tajfel et al., 1971), driving affective processes that foster intergroup discrimination along the basic ingroup-outgroup distinction. This explanation is supported by many studies showing that a simple and ostensibly random allocation into so-called "minimal groups" is already sufficient to elicit intergroup bias in attitudes and behavior (Dunham et al., 2011; Tajfel et al., 1971), pointing to the importance of "mere membership" (Dunham, 2018). If these psychological processes were the only drivers of intergroup bias, they should affect all types of outgroups similarly (Dunham, 2018; Kurzban et al., 2001). Following this logic, humans should show the same level of intergroup bias across all kinds of outgroup comparisons. However, in the past decades research has identified another important

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[1] Note that while it would be interesting to disentangle positivity shown towards the ingroup vs. negativity shown towards the outgroup (see, e.g., Brewer, 1999), in the context of this paper we will mostly focus on the relative ingroup-outgroup comparison.

driver of humans' intergroup bias; the social context. Several specific contextual factors have been found to additionally drive (or inhibit) the manifestation of intergroup bias, such as status (Bigler et al., 2001), intergroup competition (Rhodes & Brickman, 2011), familiarity (Bar-Haim et al., 2006), similarity (Diesendruck & Weiss, 2015), and cooperation (Misch et al., 2021). As these contextual factors differ tremendously between different groups, each ingroup-outgroup comparison should elicit different levels of intergroup bias. Whereas the individual impacts of both a general human tendency and of contextual factors have been investigated in many experiments, little is still known about the extent to which both the general psychological tendency and contextual factors contribute to the manifestation of intergroup bias across childhood development. More specifically, do young children show the same or different levels of intergroup bias in the context of different types of outgroups? How might the trajectories of different forms of bias unfold across childhood development?

To answer these questions, we investigated the developmental trajectory of attitudes towards multiple outgroups simultaneously (in particular gender and three racial outgroups). As these outgroups differ in important features, this comparison allowed us to identify the extent to which general psychological tendencies (which could influence children's reactions to all kinds of outgroups similarly) versus contextual factors (which differ between groups) contribute to children's intergroup bias across development. By doing so, we gained a better understanding of the processes and factors that are involved in the formation and manifestation of intergroup bias in children over time.

In addition, by using a within-subjects design, we were able to explore whether there are individual differences in the extent to which children tend to show intergroup bias. Recent research on adults suggests that there are individual differences in the extent to which individuals identify with and show intergroup bias with regard to different kinds of groups. Kranton et al. (2020) have assessed adult participants' intergroup bias towards both political and minimal groups and have found a strong positive correlation between the level of intergroup bias shown in the political group context and the level of intergroup bias shown in the minimal group context, and suggested that these findings might be interpreted in the sense of an underlying trait-like tendency for ingroup bias, such that individuals who show high intergroup bias in one context also tend to show high intergroup bias in another context (and vice versa). Similarly, research with children has shown that some children tend to show more intergroup bias than others (Bigler & Liben, 1993; Martin & Fabes, 2001), but no research has systematically investigated the relationship between intergroup bias towards different groups. The only related research investigated the correlations between children's trait attributions towards members of different social groups (gender, language, body weight) and found no conclusive evidence for consistency of prejudice between domains (Powlishta et al., 1994). Thus, the question of whether individual differences in "groupiness" (Kranton et al., 2020) are already visible in childhood remains open.

According to Social-Cognitive Developmental Theory (Aboud, 2008), children's early and strong ingroup preference is primarily driven by simple affective responses along the ingroup-outgroup distinction as well as their focus on social group membership ("sociocentrism"), and thus children show equally strong intergroup attitudes towards all kinds of outgroups in early childhood. And indeed, young children show intergroup bias along group dimensions such as language (Kinzler et al., 2007), gender (Miller et al., 2006), and race. For example, White (North American) children show high levels of implicit and explicit racial intergroup bias when the outgroup is Black (Baron & Banaji, 2006; Bigler & Liben, 1993), Asian (Dunham et al., 2006, 2013), or First Nation (Doyle & Aboud, 1995), speaking to a general evaluation based on "mere group membership" (Dunham, 2018). Between the ages 7 to 10, children's explicit racial ingroup preference has been found to slowly decline (Bigler & Liben, 1993; Doyle & Aboud, 1995). These developmental changes have been explained by two processes. First, by a shift from affective towards more cognitive processes, which allows children

to consciously reflect on their attitudes towards others. Second, by a shift from their focus on aspects on the group level to aspects on the individual level, which allows for the reconciliation of different perspectives (Aboud, 2008).

Yet it is clear that societal and contextual factors also play a role in the early formation and manifestation of racial intergroup attitudes. Children are apt social learners who observe their social environment and quickly absorb and integrate patterns, norms and attitudes which are prevalent in their society (Bigler & Liben, 2006; Nesdale, 2004). One relevant factor here is perceptual distinctiveness (vs. similarity), which has been proposed to increase the psychological salience of group boundaries (Bigler & Liben, 2006) and as a consequence promotes intergroup bias, especially at a young age (Aboud, 2008). Indeed, children show higher intergroup bias when groups are visibly marked (Bigler, 1995; Dunham et al., 2011; Patterson & Bigler, 2006; Richter et al., 2016) and prefer those who are similar to them in physical appearance (Fawcett & Markson, 2010; see also Haun & Over, 2015). However, it is unclear whether perceptual distinctiveness also plays a role in the context of racial groups. If this is the case, we should see that children show less positive attitudes towards those who look more different than themselves. Thus, White children should show higher intergroup bias towards Black children than towards East Asian children, as the dark skin tone of Black children is a more distinct and salient group marker compared to the factors which distinguish White from Asian appearance (Dunham et al., 2015; Dunham, Dotsch, et al., 2016).

Another important factor which might inhibit the formation of intergroup bias is familiarity (Bornstein, 1989; Moreland & Zajonc, 1982; Zajonc, 2001), as some research suggests that humans prefer and develop sympathy towards others who they are familiar with (or have more frequent exposure to). For example, infants look longer at faces of the race they are familiar with (Bar-Haim et al., 2006) and studies with adults have found that familiarity (vs. unfamiliarity) with facial features of racial groups is negatively associated with ingroup favoritism and outgroup prejudice (Zebrowitz et al., 2007). These findings suggest that familiarity might inhibit the manifestation of children's intergroup attitudes. In addition, familiarity also often means that people have the opportunity for interaction and positive experiences with outgroup members, in other words, intergroup contact (Allport, 1954). Many studies have shown that intergroup contact can indeed reduce intergroup attitudes and negative stereotypes in adults as well as in children (see Cameron & Turner, 2016, for an overview), most likely as it enables intergroup cooperation and intergroup friendship, or provides exposure to counter-stereotypic exemplars. However, in order to become familiar with members of a certain outgroup, children need opportunities for cross-group encounters and interaction in their daily life. The bigger a particular outgroup is, the more frequent such opportunities should arise in kindergartens, schools, and on playgrounds. Thus, children should be more familiar with members of bigger outgroups than of smaller outgroups. Finally, children are affected by prevalent stereotypes and the salience of intergroup conflict, status differences, and attitudes in their social environment (Nesdale, 2004). One set of research shows, for example, that at least by age 4, humans are sensitive to status information regarding outgroups from early on and thus show higher explicit prejudice towards outgroups which are lower in status (Dunham et al., 2006, 2014; Newheiser et al., 2014; Shutts et al., 2011).

The manifestation of attitudes in the context of gender groups seems to follow a similar developmental trajectory, suggesting that the same general group identity processes are at work (Arthur et al., 2008; Patterson & Bigler, 2006; Powlishta, 1995). For instance, at least by age 5, children identify with (Bennett & Sani, 2008a, 2008b) and show strong preferences for their gender ingroup (Dunham, Baron, & Banaji, 2016). Whereas these gender preferences are robust and less malleable to experimental manipulation (compared to minimal groups; Dunham et al., 2011; Misch et al., 2021), these preferences and attitudes are also strongly shaped by prejudice and the group-attribute covariations children encounter in their environment (Bigler & Liben, 2006). For

example, girls show stronger gender ingroup preferences than boys (Dunham, Baron, & Banaji, 2016), and at the same time show early internalization of detrimental gender stereotypes regarding "male brilliance" and "female niceness" (Bian et al., 2017). Research on the development of gender and racial group cognition points to a relative priority of gender groups: children correctly identify with their own gender earlier than with their own race (Katz & Kofkin, 1997), encode gender more robustly than race (Weisman et al., 2015), and see gender categories as less flexible than race categories (Rhodes & Gelman, 2009). However, little research has directly compared the development of intergroup attitudes towards gender and racial groups simultaneously.

The aim of the present study was to assess the developmental trajectory of race- and gender-based intergroup bias in 5- to 10-year-old primarily White German children. This age range was found to be an important period for the formation and manifestation of intergroup attitudes, for example via a decline in the magnitude of ingroup preference (Raabe & Beelmann, 2011). More specifically, we investigated the developmental trajectory of intergroup bias with regard to different racial and gender groups, and compare children's attitudes towards those groups in order to get a better understanding of the processes and factors involved in the manifestation of intergroup bias.

Predominant theories (e.g., Aboud, 2008; Nesdale, 2004; Tajfel et al., 1971) and previous findings (e.g., Doyle & Aboud, 1995; Dunham et al., 2006; Dunham et al., 2016) lead to the hypothesis that overall, children show an explicit intergroup bias (i.e., show relative higher liking and preference for members of their ingroup compared to members of their outgroup) in the context of racial groups (East Asian, Black, Middle East, White) and gender groups (female, male; Hypothesis 1). In line with Social-Cognitive Developmental Theory (Aboud, 2008), younger children should show relatively high levels of preferences for the ingroup compared to all kinds of outgroups, which should decrease with age (Hypothesis 2). According to Developmental Intergroup Theory (Bigler & Liben, 2006) and Social Identity Development Theory (Nesdale, 2004), children's intergroup bias is mainly acquired through social learning and societal context variables, which should result in different developmental trajectories for the different ethnic outgroups (Hypothesis 3). A closer investigation of these differences might help to identify the relative importance of a number of different factors in the context of racial intergroup bias: If the manifestation of intergroup bias is mostly affected by the level of unfamiliarity (vs. familiarity) with outgroups, we should see that participants show most intergroup bias (i.e., higher relative liking and preference for the White ingroup) when outgroup members are East Asian or Black, as these are relative small minority groups in Germany and thus offer little opportunity for familiarity and intergroup contact. In contrast, participants should show only little bias when outgroup members are children from the Middle East, as they are the biggest majority in Germany (Hypothesis 3a). If children's intergroup bias is primarily guided by perceptual distinctiveness, we should see that children would show most bias in the context of the most distinctive outgroup, Black children, and less in the context of East Asian and Middle Eastern children (Hypothesis 3b). If children's intergroup bias is fundamentally influenced by salience of group conflicts and interracial problems in their daily life and the media, we should see most bias towards Middle Eastern children, less bias towards Black children, and least bias towards East Asian children (Hypothesis 3c). In 2015, a high number of refugees came from the Middle East to Europe, and this so-called "refugee crisis" (United Nations High Commissioner for Refugees, 2015) increased the salience of intergroup conflicts and prevalence of stereotypes in the public media with this particular groups over the subsequent years.

Finally, if there is a trait-like tendency for group bias that generalizes across different groups, we expect to find that children's intergroup bias with regard to different groups is correlated (i.e., children showing high intergroup bias regarding one outgroup will also show higher intergroup bias regarding another outgroup; Hypothesis 4).

2. Method

2.1. Participants

The final sample consisted of 100 children (53 girls, 47 boys) between 5 and 10 years ($M = 8.04$, $SD = 1.67$). Three more children were tested but excluded for giving the same response across all questions (2) or for shyness (1). As questions regarding race and ethnicity are unusual and sensitive in Germany, we did not directly ask parents to indicate their child's ethnicity. Instead, we asked children to indicate their racial self-similarity by pointing at pictures of children from different racial groups in the end of the study. The vast majority, 75 %, pointed to pictures of White children, 14 % to Middle East, 8 % to East Asian, 2 % to Black-White mixed, and 1 % at Black children. As we noticed that these self-ratings often diverged from their physical appearance and from parents' informal reports after the study, which confirmed that children were White in most cases, we additionally asked a blind and independent person to code children's race from the video recordings of the sessions (72 % of the sessions were codable from video, due to differences in parental consent and technical issues). According to this coding, 96 % of participants were White, 3 % were White-mixed, and 1 % were East-Asian. Children's ratings matched the independent coder's rating in 75 % of cases. Thus, the vast majority of our sample was White. Due to the low number of non-White children in our sample, the divergence of the two ratings, and in line with previous research showing that children of minority groups often assimilate the attitudes of the majority group (Corenblum & Annis, 1993; Newheiser & Olson, 2012; Steele et al., 2018), we analyzed data from all participants together.

To estimate the necessary sample size, we focused on the main measure of interest; children's race-based preferences. Previous research using a similar preference task found mean ingroup preferences of 65 % and 76 % in Japanese and American children, respectively (Dunham et al., 2006). Using the R package "pwr" (Champely et al., 2020), we calculated the effect sizes (*Cohen's h* = 0.55 and 0.3) and the estimated sample sizes needed to replicate these results ($n = 27$ and $n = 85$), in order to replicate the findings regarding ingroup preference (with *alpha* = 0.05, *power* = 0.8). To allow for an investigation of potential age-related changes and to account for drop-outs, we decided to aim for an even more conservative sample size of $n = 100$.

The majority of participants were tested in an online video conference setting due to Covid-19. Families were recruited through the University's participants' database, word of mouth and online advertisement. Twelve children were tested in person at a festival after restrictions were eased. Written parental consent as well as children's verbal consent was obtained prior to all test sessions. Testing was conducted by a female (White) experimenter who walked children through the stimuli in a Qualtrics survey (Qualtrics, 2020). Each session took approximately 15–30 min. The experiments were developed and conducted in accordance with ethical guidelines and were approved by the Ethics Committee of the Faculty of Psychology and Pedagogy of Ludwig Maximilian University of Munich.

2.2. Materials

2.2.1. Target pictures

In all tasks we used pictures which depicted portrait photographs of friendly-looking children. These pictures were created with artificial intelligence (Generated Photos, 2021) and can be found in Supplemental Materials A. We selected photographs based on results of a pilot study in which 21 German adults rated a set of 64 photographs regarding children's age, ethnicity, likeability, and attractiveness. We only used photographs in which targets were clearly identified by the majority of participants as belonging to one of the four racial categories. From those we chose photographs which were rated equally regarding age, likeability, and attractiveness. Sixteen photographs of children (4 per racial group, equally divided by gender) were used as stimuli in the liking task

and as stimuli in the preference task (gender). Sixteen additional photographs of children (4 per racial group, equally divided by gender) were used as stimuli in the preference task (race). An additional set of 10 photographs were used as distractor items for the preference task, depicting toddlers, adults and elders of different gender and race.

2.2.2. Rating scale

A 5-point Likert scale with faces ranging from an unhappy face to a happy face were used for participants to indicate their liking for the pictures in the liking tasks.

2.3. Procedure

2.3.1. Demographics and warm-up

First, children were asked to indicate their gender and their age. Then they were familiarized with the 5-point Likert scale ranging from an unhappy face to a happy face and practiced to indicate their liking for ice-cream, a bowl of rice, and a raw onion (see Supplemental Materials B for the detailed procedure).

2.3.2. Liking task

After the warm-up, participants were asked to use the smiley scale to indicate their liking for each of the 16 children presented on the photographs (4 of each race, equally divided by gender). These pictures were presented in a randomized order.

2.3.3. Preference task

In a second part, participants were presented with a series of paired pictures and asked to indicate, which of the two people they preferred ("Which one do you like better?", adapted from Baron & Banaji, 2006; Dunham et al., 2006). To assess children's racial preference, 24 critical pairs were used in which two same-gender children of different race groups were depicted side-by-side. Each possible combination (e.g., East Asian vs. Black, East Asian vs. Middle East, White vs. Black) was presented equally often (i.e., 4 times). To assess children's gender preference, eight critical pairs were used in which two same-race children of different gender groups were depicted side-by-side. To divert children's attention from race and gender categories, ten additional distractor items were used in which adults, elders, and toddlers of different race and gender groups were presented. Participants were instructed to indicate quickly and without much thought which of the two presented people they liked better. The first three trials for each participant were distractor trials, all other trials were presented in fully randomized order.

2.3.4. Self-similarity

After the test trials, participants were shown a set of five different racial groups, each depicting four same-gender children of one race (East Asian, Black, Middle East, White, Black-White mixed) and asked to point to the children "who looks most like you"(Mandalaywala et al., 2021). For this task and the next one, we added an additional group of Black-White mixed children, to give children a wider range of answer options.

2.3.5. Friend similarity

For exploratory reasons, we also assessed the gender and race of children's friends. First, children were asked to talk openly about their friends, their names and what they liked to play. Children were then explicitly asked whether their friends were boys or girls, or both boys and girls. Depending on this answer, they were shown the same five racial groups of children, but with their friends' gender and asked to point out the children who looked most like their friends. Here, multiple choices were possible.

2.3.6. End of study

After the study, participants were asked 3 more questions about their

favorite animal, food, and toys. After each of their answers, the experimenter showed them pictures of other children of differing race and gender, telling them that these children had made the same choices. This debriefing was done to emphasize similarities between children and divert attention from any of the categories used in the study. Finally, children and parents were thanked for their participation. Parents were given the opportunity to ask questions. After the study, participants received a participation certificate and a coloring picture as a reward via email.

2.4. Data analysis

Data analysis was conducted using R (R Core Team, 2019) in R Studio. Data cleaning was undertaken using the package Tidyverse (Wickham et al., 2019). The packages lme4 (Bates et al., 2022) and lmerTest (Kuznetsova et al., 2020) were used to run the mixed linear models and linear models. The package emmeans (Lenth et al., 2022) provided follow-up tests and effect sizes. Random intercepts and slopes were added in a stepwise process and only retained when improving the model fit significantly according to AIC/BIC and significance established through likelihood ratio tests. After that, all fixed effects were added according to our hypotheses into a full model, and compared to reduced models using likelihood ratio tests, retaining interaction terms that were significant or part of a higher-order interaction. Missing values were omitted from the analysis.

2.4.1. Liking tasks

To investigate children's racial and gender intergroup bias (H1), we ran linear mixed models with target group (ingroup vs. outgroup) as predictor variable (fixed effects), and the liking sum score as dependent variable. To investigate potential age effects (H2), age was added as an interaction term. Gender was only added as an interaction term in the analyses of children's gender group attitudes. Intercepts for subjects and items, as well as by-subject slopes for the effect of condition were added as random effects.

When appropriate, follow-up tests were run with children divided into two separate age groups, younger children (5–7 years) and older children (8–10 years).

To compare children's attitudes between different racial outgroups (H3), a linear mixed model was run with target group (White, Black, East Asian, Middle East) and age as predictors, and the liking score as dependent variable. Tukey-adjusted pairwise comparisons were conducted to investigate the differences between the 4 racial groups.

To explore whether cross-group friendship had an effect on children's liking scores, we added the variable friendship group (binary coded as ingroup vs. outgroup) as an additional predictor variable.

2.4.2. Preference tasks

Participants ingroup preference was defined as the percentage of trials in which they showed a relative preference for the ingroup (White/their gender group) versus each of the outgroups (East Asian, Black, and Middle Eastern / the other gender group). Thus, a 100 % indicated that they chose the ingroup across all trials, 50 % indicated no preference for either of the groups, and 0 % indicated that they chose the outgroup across all trials. To compare ingroup preferences across different race outgroups and to assess the developmental trajectory, a linear mixed model was run with percentage of ingroup choices against each of the outgroups as dependent variable, and outgroup target and age as continuous variables (fixed effects) (H1,H2,H3), and subject intercept as random effect. The analysis of children's gender ingroup preferences did not include repeated measures and thus was done via linear models. When model assumptions were detected via visual inspection of residual plots, bootstrapped confidence intervals ($R = 2000$) (Fox, 2015) were added.

To test whether the relative preference for the ingroup over the outgroup was significantly different from chance level, we used one-

sided *t*-tests (*mu* = 50 %) with Bonferroni correction (H1,H3).

To explore whether cross-group friendship had an effect on children's liking scores, we repeated the analyses as described above but added the variable friendship group (binary coded as ingroup vs. outgroup) as an additional predictor variable, allowing for an interaction with the other fixed effects.

2.4.3. Comparison across all groups

To investigate the relationship of children's intergroup biases shown with regard to the different outgroups (H4) in the liking tasks, we first averaged liking scores for each of the gender and racial groups for each participant and then calculated the difference scores for each ingroup-outgroup comparison as a measure of children's average intergroup bias in the context of that particular outgroup. For the analysis of children's responses in the preference task, we used the same percentage scores as described above. We then investigated the correlations between these scores for both tasks separately via Spearman correlations (as assumptions of normality were violated).

2.4.4. Deviations from the preregistration

We deviated from our pre-registered analysis plan in the following ways: To account for the repeated-measures structure of our data in the liking tasks and the preference tasks (a fact that we had overlooked in the preregistration), we used mixed linear models instead of linear models or regressions. To analyze participants' ingroup preference in the preference tasks against chance level (50 %), we used one-sided *t*-tests (in line with Dunham et al., 2006), which allowed for a more fine-grained and appropriate analysis of the results than binomial tests (for which dichotomizations of the data would have been necessary first, which incurs a loss of information).

The preregistration of this study can be found at https://osf. io/njdep/?view_only=24a495bb4f0d40ca815b7dc5af6bb8bb. The data and R code are also publicly available here: https://osf.io/n39a4/? view_only=bd13f15d821b46f79643d65a3fe9717d.

3. Results

3.1. Descriptive results

For the friend(s) similarity task, the vast majority, 94 %, indicated that their friend(s) were White. A large number of children, 74 %, indicated that they had (additionally) at least one friend from a racial outgroup (50 % Middle East, 37 % East Asian, 18 % Black, 18 % Black-White mixed). Turning to gender groups, 92 % indicated they had friends from the gender ingroup, and 63 % indicated that they had friends from their gender outgroup (40 % girls and 23 % boys). Note that here children were allowed to point to more than one picture, and thus numbers can exceed 100 %.

3.2. Main analysis

3.2.1. Race groups (liking task)

To investigate whether children showed an explicit intergroup bias in the context of racial groups (H1) and whether it changed across age (H2), we first looked at children's intergroup bias towards the ingroup (White) compared against all outgroups together. Children showed a significant ingroup preference in their liking score as indicated by a main effect of target group (*Estimate* = −1.27, $t(107) = -4.58$, $p < .001$, 95%CI [−1.77, −0.76], $d = 0.24$); they showed greater liking for White (ingroup) children ($M = 0.6$) compared to all other outgroup children ($M = 0.33$). This main effect was qualified by a significant interaction of age and target group (*Estimate* = 0.13, $t(100) = 3.88$, $p < .001$, 95 % CI [0.06, 0.20]), indicating that children's ingroup preference decreased with age (see Table C1 and C2 in the Supplemental Materials C). Follow-up tests with children divided into two age groups (5–7- and 8–10-year-olds) revealed that only younger children showed a significant

preference for their ingroup members (*Estimate* = 0.48, $t(29) = 3.83$, $p < .001$, 95 % CI [0.22, 0.73], $d = 0.54$), whereas older children did not ($p = .562$). Thus, our results provide support for H1 (children show explicit racial intergroup bias), but only for younger children. This age difference confirms H2 (explicit racial intergroup bias decreases with age).

To compare bias between the three different outgroups (H3), we investigated participants' relative preference including all four racial groups with White children's photographs set as baseline. We found a significant interaction between age and racial target group ($F(3, 258) = 8.34$, $p < .001$). The model revealed that compared to White children, participants showed lower ratings for East Asian (*Estimate* = −1.29, $t(194) = -4.00$, $p < .001$, 95 % CI [−1.92, −0.65], $d = 0.31$) and Black children (*Estimate* = −1.83, $t(197) = -5.69$, $p < .001$, 95 % CI [−2.47, −1.20], $d = 0.47$). These main effects were qualified by significant interactions with age (for East Asian: *Estimate* = 0.14, $t(196) = 3.36$, $p = .001$, 95 % CI [0.06, 0.21]; for Black: *Estimate* = 0.19, $t(196) = 4.67$, $p < .001$, 95 % CI [0.11, 0.27]), suggesting again that children's racial intergroup bias for East Asian and Black outgroup members decreased with age. With regard to Middle Eastern children, only a marginally significant main effect was found (*Estimate* = −0.67, $t(194) = -2.10$, $p = .037$, 95 % CI [−1.31, −0.04], $d = 0.16$) (Table C3) (Fig. 1).

Tukey-adjusted follow-up tests were conducted to compare liking scores for all groups. They confirmed significant differences in younger children's liking scores between White and East Asian (*Estimate* = 0.49, $t(39) = 3.55$, $p = .005$, 95 % CI [0.12, 0.86], $d = 0.56$), White and Black children (*Estimate* = 0.71, $t(39) = 5.11$, $p < .001$, 95 % CI [0.34, 1.08], $d = 0.80$), and additionally revealed a significant difference between Black and Middle Eastern children (*Estimate* = −0.48, $t(35) = -3.57$, $p = .005$, 95 % CI [−0.83, −0.12], $d = -0.54$). No significant differences were found between White and Middle East ($p = .354$), East Asian and Middle East ($p = .224$), and East Asian and Black children ($p = .383$). None of the pairwise-comparisons were significant in the older children (all ps > 0.810). Thus, in line with H3, we found significant differences in younger children's explicit intergroup bias in the context of different ethnic groups. The lowest liking scores for Black outgroup members provide some support for the role of perceptual distinctiveness (H3b), whereas the relatively high scores for Middle Eastern outgroup members also suggest an influence of familiarity (H3a).

3.2.2. Race groups (preference task)

When investigating the developmental trajectory of participants' ingroup preferences with regard to all three outgroups in the preference task, we also found that children's ingroup preference decreased with age (*Estimate* = −4.55, $t(100) = -3.32$, $p = .001$, 95 % CI [−7.26, −1.84]), again supporting H2. A significant main effect of target outgroup ($F(2,200) = 6.17$, $p = .003$, $d = 0.30$) suggests that participants showed different levels of ingroup preference in the context of different outgroups, as was predicted by H3 (Fig. 2) (Table C4). Tukey-adjusted pairwise comparisons revealed that children showed more ingroup preference when the outgroup was Black compared to when the outgroup was East Asian (*Estimate* = −8.75, $t(202) = -3.23$, $p = .004$, 95 % CI [−15.14, −2.36], $d = 0.46$) or when the outgroup was Middle Eastern (*Estimate* = 7.5, $t(202) = 2.77$, $p = .02$, 95 % CI [1.11, 13.89], $d = 0.39$), speaking again to the role of perceptual distinctiveness (H3b). There was no significant difference between ingroup preference shown towards East Asian and Middle Eastern children ($p = .89$).

When testing participants' ingroup preference against chance level (50 %) using Bonferroni-corrected one-sided *t*-tests, we found a significant overall ingroup preference of 73 % ($t(299) = 13.56$, $p < .001$, 95 % CI [69.31, 75.86], $d = 0.78$), which was visible in both younger (78 %, $t(149) = 14.06$, $p < .001$, 95 % CI [74.06, 81.94], $d = 1.15$) and older children (67 %, $t(149) = 6.60$, $p < .001$, 95 % CI [62.02, 72.31], $d = 0.54$), speaking to an explicit ingroup bias across both age groups, as was predicted by H1. Children showed significant ingroup preferences with regard to East Asian (69 %, $t(99) = 6.22$, $p < .001$, 95 % CI [63.12, 75.39], $d = 0.62$), Black (78 %, $t(99) = 10.23$, $p < .001$, 95 % CI [72.57,
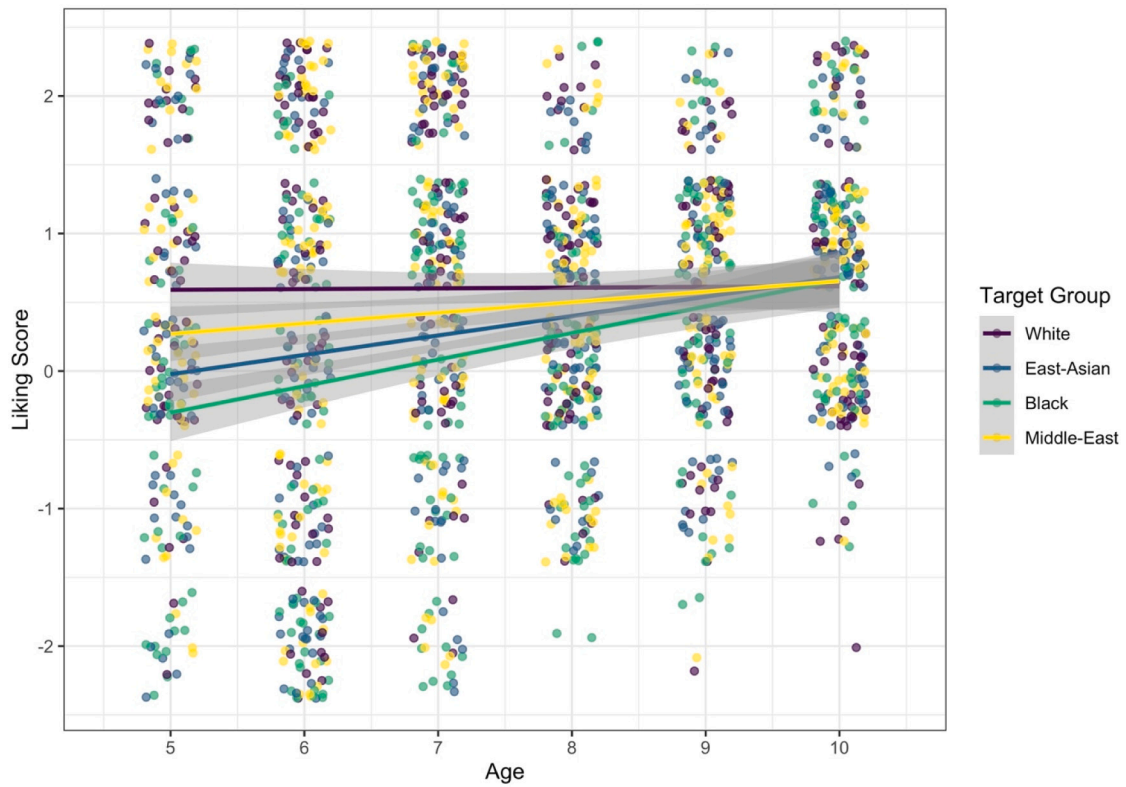
Fig. 1. Children's liking scores for children of all racial groups across age.
Note. Dots depict paticipants' liking score for each of the 16 stimuli (4 per group/participant). The colored lines are regression lines with 95 % confidence bands.
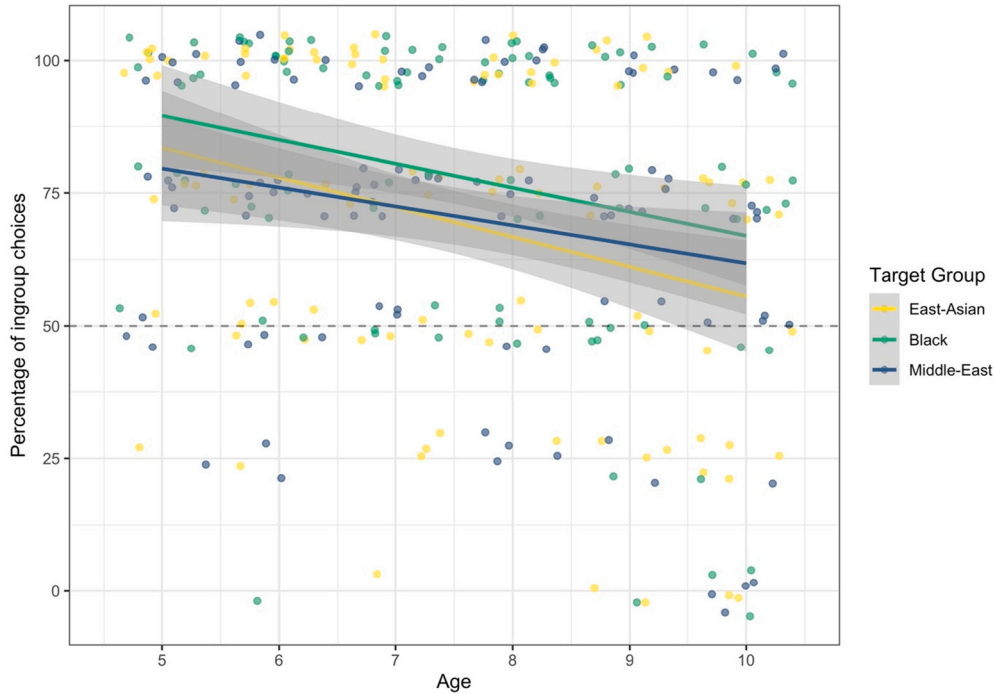

Fig. 2. Percentage of ingroup (White) choices with regard to the three different outgroups East Asian, Black, and Middle East.
Note. Values >50 % indicate a preference for the ingroup, values <50 % indicate a preference for the outgroup. Dots depict each participant's ingroup percentage score for each of the 3 group comparisons. The colored lines are regression lines with 95 % confidence bands.

83.43], $d = 1.02$), and Middle East outgroup members (71 %, $t(99) = 7.42$, $p < .001$, *95 % CI* [65.02, 75.98], $d = 0.74$) (Fig. 2).

3.2.3. Gender groups (liking task)

Turning to an investigation of H1 and H2 in the context of children's attitudes towards gender groups, we found a significant main effect of

gender target group (*Estimate* = −2.17, *t*(107) = −5.32, *p* < .001, *95 % CI* [−2.98, −1.36], *d* = 0.61), which was qualified by interactions of gender target group and participants' gender (*Estimate* = 1.53, *t*(110) = 2.50, *p* = .01, *95 % CI* [0.31, 2.74]), gender target group and age (*Estimate* = 0.18, *t*(100) = 3.56, *p* < .001, *95 % CI* [0.08, 0.28]), as well as a three-way interaction between gender target group, participants' gender, and age (*Estimate* = −0.17, *t*(100) = −2.21, *p* = .03, *95 % CI* [−0.32, −0.02]). Thus, in line with H1, children showed an explicit ingroup bias for their own gender group. This ingroup bias was stronger in younger girls but decreased considerably with age, providing partial support for H2 (Fig. 3) (Table C5 in Supplemental Materials C).

Tukey-adjusted pairwise comparisons, however, confirmed that the main effect of target gender group was significant for both younger girls (*Estimate* = 1.05, *t*(39) = 8.72, *p* < .001, *95 % CI* [0.81, 1.29]) and younger boys (*Estimate* = 0.56, *t*(42) = 4.56, *p* < .001, *95 % CI* [0.31, 0.80]) as well as older girls (*Estimate* = 0.54, *t*(38) = 4.52, *p* < .001, *95 % CI* [0.30, 0.78]) and older boys (*Estimate* = 0.50, *t*(44) = 4.04, *p* < .001, *95 % CI* [0.25, 0.75]), suggesting that gender-based preferences were still present in older children (H1).

3.2.4. Gender groups (preference task)

When testing participants' gender ingroup preference against chance level (50 %) using one-sampled *t*-tests, we found a significant overall ingroup preference of 80 % (*t*(99) = 14.38, *p* < .001, *95 % CI* [76.1, 84.42]), again providing evidence for H1 (Fig. 4). Interestingly, and contrary to H2, age (and gender) had no significant influence (null-full model comparison, *p* = .192) (see Table C5 in the Supplemental Materials C).

3.2.5. Comparison across groups

Finally, we explored the relationship between children's intergroup bias towards the different types of groups (H4). We found significant positive correlations between children's intergroup bias in the context of all three racial outgroups (*r*s > 0.51, *p* < .001), but not between racial

intergroup bias and gender intergroup bias (*p*s > 0.567) (see Table 1).

The same pattern was found for correlations between children's responses in the preference tasks; we found high positive correlations between ingroup preferences in the context of all racial outgroups (*r*s > 0.47, *p* < .001), but no correlation with gender bias (*p*s > 0.24) (see Table 2). Thus, we found only partial support for H4, in which we predicted a trait-like tendency underlying children's intergroup bias.

3.3. Exploratory analysis: friendship

3.3.1. Racial groups

A mixed linear model investigating the effect of children's cross-racial friendship (pooled across all racial outgroups) revealed a significant main effect of outgroup friendship on children's scores in the liking task (*Estimate* = 1.73, *t*(101.41) = 2.47, *p* = .015, *95 % CI* [0.34, 3.11], *d* = 0.32), suggesting that children with more outgroup friends showed higher liking scores generally, towards both ingroup and outgroup members. This effect was qualified by a significant interaction of outgroup friendship and age (*Estimate* = −0.2, *t*(100) = −2.23, *p* = .03, *95 % CI* [−0.37, −0.02]), suggesting that outgroup friendship had an effect mainly on younger children's liking scores. However, the main effect of interest, the interaction between outgroup friendship and target group, was only marginally significant (*Estimate* = 0.24, *t*(100) = 1.93, *p* = .06, *95 % CI* [−0.01, 0.49]), providing no clear evidence for the hypothesis that outgroup friendship contributes to children's intergroup attitudes (see Table D1 and Fig. D1 in the Supplemental Materials D).

To investigate whether children's cross-group friendship had an effect only for the particular outgroup they were friends with, we ran separate Welch *t*-tests on children's mean difference liking score (ingroup minus outgroup liking) for that particular group liking score, comparing the means of children who reported having a friend in that particular outgroup with children who did not. Again, we found no significant effect of friendship in any of the groups (*p*s > 0.124).

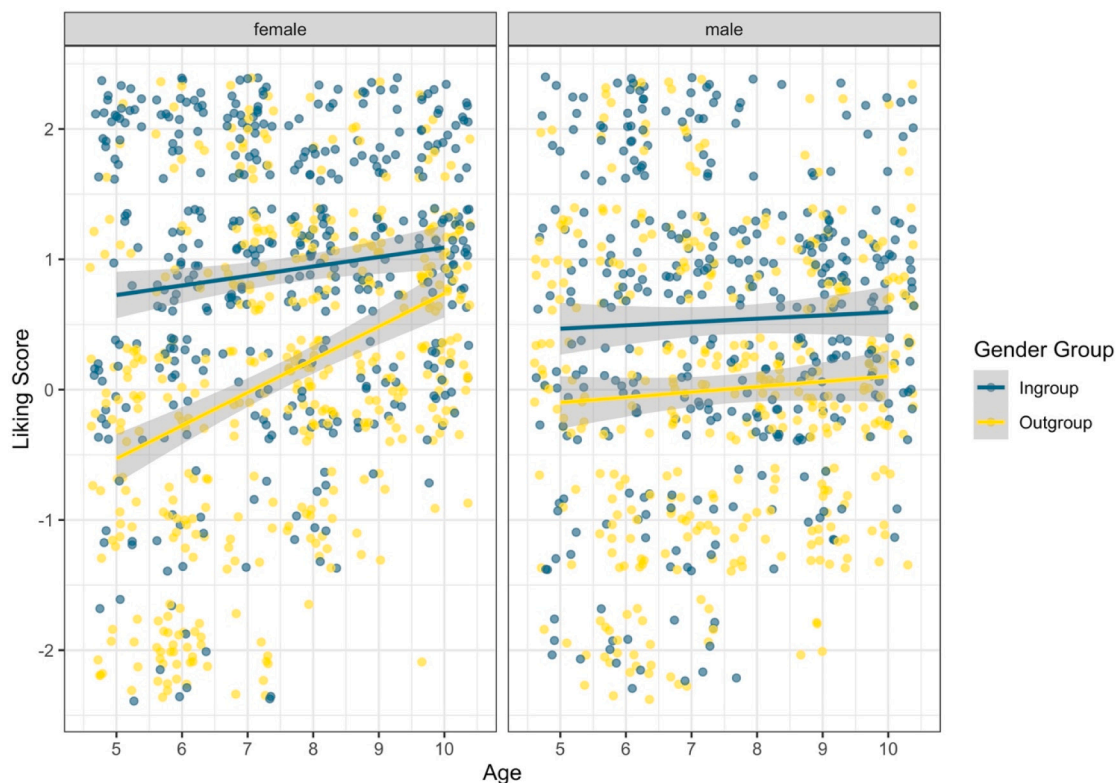The analysis of the preference task revealed no effect of outgroup

Fig. 3. Children's liking scores for their gender ingroup and outgroup members, separately for female and male participants.
Note. Dots depict children's liking score for each of the 16 stimuli (2 per group/participant). The colored lines are regression lines with 95 % confidence bands.
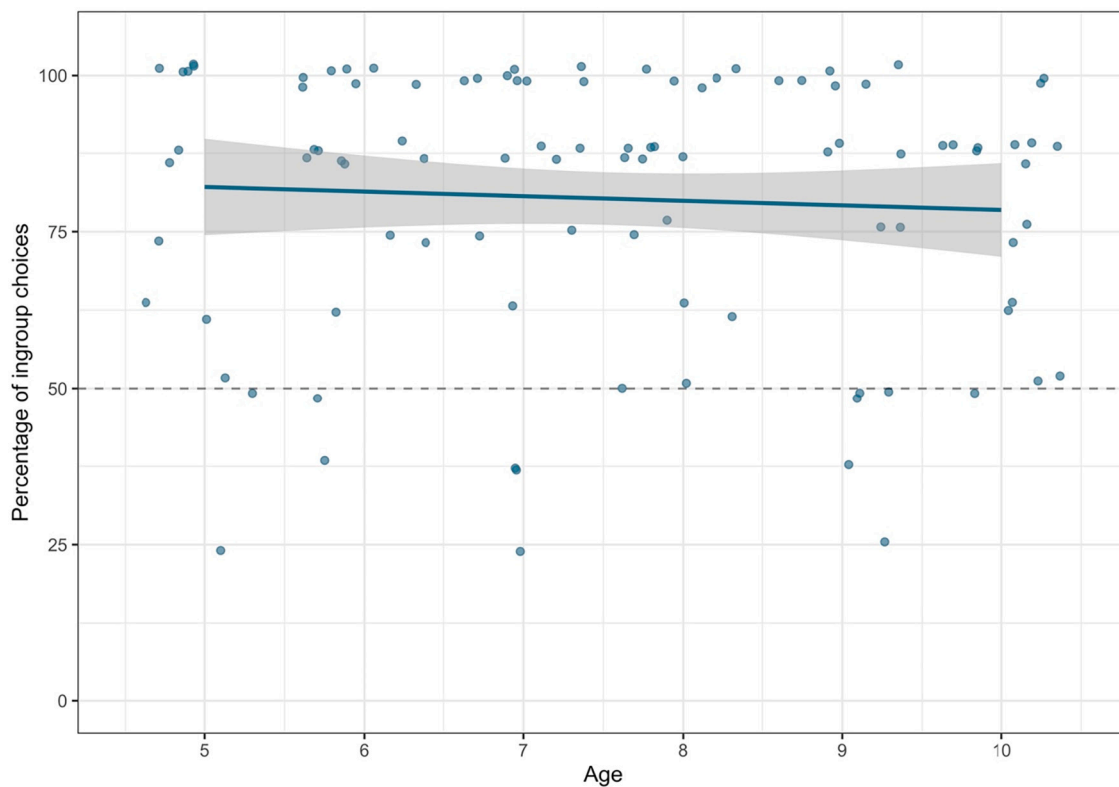
Fig. 4. Percentage of gender ingroup choices.

Note. Values >50 % indicate a preference for the ingroup, values <50 % indicate a preference for the outgroup. Dots depict each participant's ingroup percentage score. The colored lines are regression lines with 95 % confidence bands.

Table 1
Spearman correlation of children's intergroup bias in the context of different outgroups (liking score).

	1. Asian outgroup	2. Black outgroup	3. Middle-East outgroup
1. East-Asian outgroup			
2. Black outgroup	0.61***		
3. Middle-East outgroup	0.57***	0.56***	
4. Gender outgroup	0.02	−0.05	−0.06

Note. *** indicates *p* < .001.

Table 2
Spearman correlation of children's intergroup bias in the context of different outgroups (preference percentage).

	1. Asian outgroup	2. Black outgroup	3. Middle-East outgroup
1. East-Asian outgroup			
2. Black outgroup	0.56***		
3. Middle-East outgroup	0.61***	0.48***	
4. Gender outgroup	0.08	0.12	0.08

Note. *** indicates *p* < .001.

friendship (*p* = .67). To investigate the effect of friendship for each race group separately we again used Welch *t*-tests with Bonferroni correction, comparing the percentage of ingroup choices between children who had friends of each particular outgroup versus those who did not. We only found a significant effect of friendship with regard to children from the Middle East (*t*(94) = 2.02, *p* = .046), but not for any of the other

outgroups (*ps* > 0.25).

3.3.2. Gender groups

Turning to the effect of children's cross-gender friendship on their liking scores, we found significant interactions between gender group and outgroup friendship (*Estimate* = 1.54, *t*(98) = 2.54, *p* = .01, *95 % CI* [0.34, 2.74]), suggesting that outgroup friendship was positively related to children's outgroup attitudes. A marginally significant three-way interaction between gender group, outgroup friendship and age (*Estimate* = −0.147, *t*(99) = −1.89, *p* = .06, *95 % CI* [−0.30, 0.01]) suggests that this effect might tend to be stronger in younger children (see Table D2 in the Supplemental Materials D).

Analysis of the preference measures confirmed the negative effect of outgroup friendship on ingroup preference (*Estimate* = −11.57, *t*(96) = −2.63, *p* = .010, *bootstrapped 95 % CI* [−18.95, −2.54] (see Table D3 in the Supplemental Materials D).

4. Discussion

The purpose of this study was to investigate and compare the different developmental trajectories of intergroup bias in children towards both racial (East Asian, Black, and Middle East) and gender outgroup members. We aimed at identifying the extent to which general psychological tendencies (which should apply to all types of outgroups equally) and contextual factors (which should differ between outgroups) affect the manifestation of intergroup bias in childhood. In addition, we were interested in exploring individual differences in children's intergroup bias.

We found that children showed intergroup bias in the context of both gender and racial groups. Racial bias decreased with age. It was still visible in older children's responses in the preference task, but not in the liking task. Intergroup bias in younger participants was highest with regard to the Black outgroup, less high with regard to the East Asian

outgroup, and almost non-existent with regard to the Middle Eastern outgroup. Importantly, even younger children did not show any negativity towards racial outgroup members (which would have resulted in negative liking scores), but just showed less positivity towards outgroup members compared to ingroup members. Thus, we conclude that intergroup bias in these contexts is not a reflection of negativity towards the outgroup, but rather a reflection of greater positivity towards the ingroup. Positivity towards ingroup members remained quite stable over time, whereas positivity towards outgroup members increased, suggesting that children's diminished intergroup bias is caused by an increased positivity towards outgroup members. In contrast, gender intergroup bias was relatively robust across all age groups. Whereas no effect of gender or age was found in the preference task, invoking the conclusion that children's gender group attitudes might not change over time, the explicit liking task offers a different picture. Here, younger girls show negativity towards the outgroup (boys), which changed dramatically with increasing age, until they evaluated outgroup members quite positively in the older age group. Boys, in contrast, evaluated their outgroup (girls) relatively neutrally across all age groups. Turning to the interrelation of children's intergroup bias towards the four different outgroups, we found strong positive correlations between intergroup bias in the context of all three racial outgroups, but not between racial and gender groups. Finally, we explored the effect of children's self-reported cross-group friendships, but found only little evidence for an association between cross-group friendship and intergroup attitudes towards Middle Eastern children and for the gender outgroup.

As predicted, our findings provide support for an early manifestation of intergroup bias in the context of different types of racial outgroups, which decreased significantly with age. This is consistent with predominant theories (e.g., Social-Cognitive Developmental Theory; Aboud, 2008) and previous findings (e.g., Baron & Banaji, 2006; Bigler & Liben, 1993; Dunham et al., 2006, 2013), speaking to an early and strong manifestation of intergroup bias along the lines of an ingroup-outgroup distinction (Dunham, 2018; Tajfel et al., 1971). At the same time, however, we saw considerable differences between the different types of outgroups from early on, highlighting the role that social and contextual influences play in the manifestation of intergroup attitudes (Bigler & Liben, 2006; Nesdale, 2004). First and foremost, young children already showed a much stronger bias in gender groups compared to racial groups, and gender-related bias remains relatively stable as children grow older. This finding dovetails nicely with previous research showing that children recognize and encode gender earlier and more reliably than race (Katz & Kofkin, 1997; Weisman et al., 2015) and also perceive gender categories as less flexible and more meaningful than racial categories (Rhodes & Gelman, 2009). Thus, these results speak to the importance of salience and meaningfulness that children assign to different groups (Bigler & Liben, 2006). Interestingly, the developmental trajectories of gender intergroup bias differed between girls and boys. Younger girls showed a stronger intergroup bias than boys. This bias was driven both by a positivity towards girls and a (relative) negativity towards boys. This negativity towards boys decreased considerably with age, but gender bias was still visible in older girls (as well as in older boys). Greater gender ingroup preference in girls has been also reported in previous research (Dunham, Baron, & Banaji, 2016; Powlishta et al., 1994; Verkuyten & Thijs, 2001). These gender differences have been discussed in light of higher ingroup identification of girls (Verkuyten & Thijs, 2001) and boys' relative dominance in cross-gender interactions as a source for girls' negativity towards boys (Charlesworth & La Freniere, 1983; Powlishta & Maccoby, 1990), but more research is needed to identify the reasons for the age-related changes in girls' gender group bias found in the present study.

The developmental trajectory of racial intergroup bias roughly followed the same pattern for the different outgroups: Bias was highest in younger children and decreased with age. However, we found significant differences regarding the strength of children's intergroup bias

between these groups. Highest bias was found when the outgroup was Black, less bias when the outgroup was East Asian, and almost no bias was found when the outgroup was Middle Eastern. These differences can help us to explore the relative importance of several contributing factors that have been proposed to foster the manifestation of intergroup bias; familiarity, perceptual distinctiveness, and salience of group conflicts. Of course, without experimental manipulation and control conditions, these conclusions have to be interpreted with great care. Nevertheless, together with children's responses in the self-similarity and friendship tasks, these differences between groups provide us with some important insights.

According to the familiarity (vs. unfamiliarity) hypothesis, we expected to find most bias when the outgroup was East Asian or Black, and least bias when the outgroup was Middle Eastern. In line with this hypothesis, least bias was found when the outgroup was Middle Eastern. People with Middle Eastern immigration background are the largest visible minority group in Germany (around 4 %) (Statistisches Bundesamt, 2020), and thus it is likely the racial outgroup with which White German children are most familiar with. Children's friendship ratings confirmed this assumption by showing that this is the outgroup with the highest number of cross-group friendship (50 % of participants reported to be friends with children from the Middle East, compared to 37 % East Asian and 18 % for both each Black and Black-White mixed friends). Contrary to this hypothesis, however, we found that Black outgroup members received significantly lower ratings than East Asian outgroup members, even though it is estimated that there are more Black (1.3 %) than East Asian people currently living in Germany (0.4 %) (Statistisches Bundesamt, 2020). Children's friendship ratings (in which they indicated similar friendship rates for East Asian and Black/Black-mixed outgroup members) also do not offer an alternative explanation for these findings. In addition, results from our exploration of the relationship between outgroup friendship and intergroup bias provide some support for a link between intergroup contact and reduced intergroup bias, but surprisingly only with regard to children from the Middle East (and with regard to gender outgroups). The missing relationship between friendship and intergroup bias in the context of the other racial outgroups, however, should be interpreted with care, due to the low prevalence of outgroup friendships as well as methodological constraints (e.g., the simple yes-no-format of the question). Thus, our data provides only partial support for the familiarity hypothesis.

According to the perceptual distinctiveness (vs. similarity) hypothesis, we expected to find most bias in the context of the most distinctive outgroup, Black children, and less in the context of East Asian and Middle Eastern outgroups. Our results show that bias was highest when the outgroup was Black, which is in line with this hypothesis. Perceptually, Black children are the most distinctive outgroup, and children's responses in the self-similarity task confirmed that the vast majority of our participants (99 %) did not perceive themselves as similar to Black children. Direct comparisons between the attitudes towards East Asian and Middle Eastern outgroup members revealed no significant differences, which is also in line with the perceptual distinctiveness (vs. similarity) hypothesis. But when taking into account the comparisons with the other (Black and White) groups, we find that overall, children showed less intergroup bias with regard to the Middle Eastern outgroup than with regard to the East Asian outgroup, suggesting that children do differentiate somewhat between these two outgroups. At first glance, this finding does not fit with the hypothesis. But this particular prediction in our hypothesis was based on the assumption that children feel equally (dis-)similar to both East Asian and Middle Eastern children. However, the descriptive results of children's self-similarity ratings suggest otherwise: Whereas 14 % of children indicated a self-similarity with Middle Eastern children, only 8 % indicated a self-similarity with East Asian children. Thus, children might have perceived more similarity with the Middle Eastern than with the East Asian outgroup, suggesting that while this specific prediction of our hypothesis might not have been accurate, our data still seems to support the hypothesis as a

whole.

According to the salience of group conflicts hypothesis, we expected to find highest bias when the outgroup was Middle East, as intergroup conflicts were sparked by the refugee crisis in 2015 (United Nations High Commissioner for Refugees, 2015). Less bias was expected when the outgroup was Black, and least bias when the outgroup was East Asian. Our findings provide no support for this hypothesis at all. However, we did not assess how much our young participants knew about interracial conflicts and discrimination against refugees, and since public conversations over the past years were heavily dominated by the global COVID-19 pandemic, it is quite likely that children were not aware of these problems. Thus, our findings seem to support the potential impact of perceptual distinctiveness (Bigler & Liben, 2006; Dunham et al., 2015; Dunham, Dotsch, et al., 2016) and to some extent of unfamiliarity (e.g., Bornstein, 1989; Moreland & Zajonc, 1982; Zajonc, 2001), but as stated above, these conclusions have to be interpreted with great care. As is often the case in research on attitudes in the context of real social groups, it is hard to isolate the effect of one or more contributing factors. Nonetheless, this study prepares the ground for future research with more careful controls.

Turning to our exploration of potential individual differences in children's propensity towards intergroup bias, the results are not so clear. We did find strong positive correlations between children's intergroup bias regarding all racial outgroups, which could be interpreted as evidence for a trait-like tendency to evaluate others along the ingroup-outgroup dimension. However, we did not find any correlation between racial group bias and gender group bias, which speaks against the hypothesis. On the other hand, it is possible that group membership based on gender triggers different cognitive and social identity processes than other types of groups, perhaps because racial groups but not gender groups are interpreted as potential cooperative coalitions (Kurzban et al., 2001). In the present study, we found that the developmental trajectory of gender group bias looks very different from the developmental trajectory of racial groups: Gender group bias is stronger and much more stable over time. Other studies in the past have found similar fundamental differences between gender groups and other group types. Children's gender group bias does not only appear earlier and stronger (Dunham et al., 2011; Katz & Kofkin, 1997), but children assign more meaning to it (Rhodes & Gelman, 2009), and are not susceptible to cooperative cues which trigger group bias in other group types (Misch et al., 2021). Thus, future research is needed to investigate the unique features of social gender identity in comparison to other social identities. Furthermore, more research is needed to answer the question regarding potential individual differences in children's propensity towards group bias, ideally involving several group types at the same time.

An additional benefit of this study is that provides and assessment of children's attitudes towards racial and gender outgroup members in Germany. The vast majority of previous research on the development of racial attitudes and stereotypes has been conducted in North America (Raabe & Beelmann, 2011) and has shown that White North American children start to show explicit racial intergroup bias from around 3 years of age, which increases until around age 7 and declines afterwards (Baron & Banaji, 2006; Doyle et al., 1988). Our results show that the manifestation of racial and gender attitudes in Germany follows a similar trajectory as in other cultures (Dunham et al., 2006, 2013), and buttresses the assumption that similar processes are involved in the manifestation of children's intergroup attitudes across different cultures (Dunham et al., 2006, 2013; Raabe & Beelmann, 2011; Steele et al., 2018). Still, future research is needed to directly compare the development and manifestation of racial evaluations across different nations and cultures (Waxman, 2021) in order to identify the effects of culture-specific contextual and societal variables.

One limitation of our research is that due to COVID-19 and limited in-person testing, we were not able to assess children's intergroup attitudes using implicit measures. Implicit measures assess attitudes in an indirect way and are thus less prone to distortion due to awareness of social norms and attempts to appear in a socially desirable light. Children's awareness of social norms as well as their ability to suppress undesired behavior increases tremendously in middle childhood (Eisenberg et al., 1997). Indeed, several studies have shown that children's implicit and explicit attitudes start to diverge sometime between the ages of 6 and 10 years: Whereas racial bias assessed through explicit measures declines, racial bias assessed through implicit measures remains stable up to adulthood (Dunham et al., 2006; Pirchio et al., 2018; cf. Degner & Calanchini, 2020). In the present study, we tried to rectify this shortcoming by administering the preference task in a less explicit, more spontaneous way. In this task, children were prompted to choose between an ingroup and an outgroup member in a number of forced-choice trials. By asking children to respond quickly without thinking too much about the task, we hoped to prompt more spontaneous responses and to limit the influence of social desirability. To divert children's attention away from racial categories, we also added some distractor trials (e.g., in which two members of the same race and gender were paired, or who differed only with regard to age). Results of this preference task revealed a decline of intergroup bias with increasing age, but also showed that significant ingroup preferences were still present even in older children – a developmental pattern that resembles the findings of previous studies using implicit measures (Dunham et al., 2006; Pirchio et al., 2018). Thus, with the preference task we might indeed have succeeded to prompt less conscious responses than in the explicit liking task. On the other hand, the explicit liking task has some advantages over implicit measures, which often demand forced choices between two groups and thus oversimplify complex social processes (for further discussion of this methodological difference see Dunham & Degner, 2013). By allowing for an independent evaluation of both ingroup and outgroup members, children were able to evaluate all targets equally positively (or negatively) in the explicit liking task. This enabled a more fine-grained analysis of the developmental trajectories of ingroup versus outgroup attitudes.

The present findings highlight the significance of researching social cognition across childhood development and identifies important avenues for future research. Our youngest participants showed the highest levels of intergroup bias, confirming that intergroup bias emerges before age five (Baron & Banaji, 2006; Doyle et al., 1988; Raabe & Beelmann, 2011). Thus, future research is needed to study the emergence of racial and gender intergroup bias in even younger children. On the other hand, we also need more research to study the development of intergroup bias beyond age 10. Whereas several studies have shown that explicit bias decreases in late childhood and is mostly indiscernible in adults, they also show that implicit bias remains high across all age groups (e.g., Dunham, Baron & Banaji, 2006). Thus, future research should investigate how the complex interplay of general psychological tendencies and contextual factors influences both implicit and explicit intergroup bias from early childhood up to adulthood.

To summarize, this study offers the first comprehensive overview of the developmental trajectories of intergroup bias towards gender and several racial groups. While we find that children showed considerable intergroup bias in the context of all outgroups, we only found little evidence for direct negativity towards the outgroup. In line with Social-Cognitive Developmental Theory (Aboud, 2008), we found that children's intergroup bias is strongest in the younger years, highlighting early childhood as an important developmental phase in which general psychological tendencies contribute to the manifestation of intergroup attitudes. Also, in line with this account, we found a stark decline of racial intergroup bias across age, which is driven by an increase in positivity towards the outgroup, whereas children's evaluation of ingroup members remains stable across ages. Importantly, however, significant differences in intergroup bias between the different outgroups are already visible in the youngest age groups, and different developmental trajectories have been found for gender and racial groups, suggesting an early influence of contextual and societal variables as proposed by Developmental Intergroup Theory (Bigler & Liben,

2006) and Social Identity Development Theory (Nesdale, 2004). Taken together, our study provides a comprehensive overview of the complex interplay of general psychological tendencies and contextual variables which affect the manifestation of children's intergroup bias.

CRediT authorship contribution statement

Antonia Misch: conceptualization, methodology, analysis, resources, data curation, writing – original draft, visualization, project administration, funding acquisition.

Yarrow Dunham: conceptualization, writing – review & editing.

Markus Paulus: conceptualization, methodology, resources, writing – review & editing.

Declaration of competing interest

There is no conflict of interest to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.actpsy.2022.103709.

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