

Early intergroup coalition: Toddlers attribute fair distributions to Black rather than White distributors

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Abstract

Racial concepts emerge in preschool age, and affect children's evaluations of others' actions. This research investigated whether 2.5-year-old and 7-year-old children's ($N = 160$; 100% White) evaluations may be influenced by an initial racial bias when both out-group and in-group protagonists were evaluated directly by attributing the responsibility of negative or positive outcomes (i.e., fair or unfair distributions of resources). After seeing each of two familiarization events, displaying fair and unfair distributions performed by a hidden distributor, toddlers were asked to assign positive and negative outcomes to two distributors that were portrayed on drawings (Experiment 1) or photographs (Experiments 2–3) of White or Black faces. Seven-year-old children were assessed with the same forced-choice character task by using photographs (Experiment 4). Toddlers showed a significant tendency to attribute a fair distribution of resources to Black faces only when these were shown by photographs. Conversely, 7-year-olds manifested a pro-White/anti-Black racial bias. These findings support prior literature on the age-related development of race prejudice starting not before the three years of life, and shed light on an initial state that is aimed at intergroup coalitions.

KEYWORDS

distributive actions, intergroup attitudes, racial bias, socio-moral development, toddlerhood

1 | INTRODUCTION

The concept of 'intergroup attitude' is used to refer to and describe those preferences or prejudices that people hold about members of specific social groups (e.g., race, gender) (Jensen & Tisak, 2018). Most researchers from diverse fields have argued that race is a "cultural construction", with little or no evidence to be defined as a biological descriptor (Maglo, 2011). In the last two decades, developmental research expanded the literature on the development of racial bias (for a recent review see Yee et al., 2022), but it remains unknown whether a racial bias may affect early social evaluations when protagonists are evaluated directly by attributing the responsibility of negative or positive outcomes.

From a developmental perspective, infant research provided evidence that infants can discriminate among their own-race faces, as well as among other-race faces. In particular, with social experience characterized by increased exposure to own-race faces rather than other-race faces, infants enforce the ability to discriminate their own-race faces (Bar-Haim et al., 2006; Kelly et al., 2007, 2009; Quinn et al., 2020; for review see Anzures et al., 2013; Sugden & Marquis, 2017). Other researchers demonstrated that exposure to other-race faces for several weeks or months restores recognition of other-race faces from infancy (e.g., Anzures et al., 2012; Heron-Delaney et al., 2011). Certainly, the visual preference for own-race faces does not reflect an early form of racial bias (Baron, 2013), but it suggests only the familiarity that infants have with own-race faces, and so an early social categorization. Indeed, although infant research has found that preverbal infants can distinguish people by race, racial concepts seem to emerge only from preschool age, since greater exposure to own- than other-race faces in infancy leads to early differences in visual preferences for, recognition of, formation of categories for, and scanning of own- and other-race faces (Lee et al., 2017). The ability to categorize faces by race continues to develop during childhood (Pauker et al., 2016), and it is affected by children's experiences with different races (Waxman & Grace, 2012). By age 4, when presented with colored face images, most children can readily categorize faces by race (e.g., Dunham et al., 2015).

By early childhood, children begin to identify with racial groups and show explicit racial preference and prejudice (Aboud, 1993; Hirschfeld, 2008). Race-based preferences emerge by 4 or 5 years of age (Aboud, 1993, 2003; Kircher & Furby, 1971; Stevenson & Stewart, 1958). Previous research suggested that children's beliefs and attitudes about race are built from their experiences and increase with growth (Raabe & Beelmann, 2011). In particular, with age, children exhibited increasing complexity in their reasoning about group dynamics by focusing more on group functioning (Killen & Rutland, 2011), group norms (e.g., Abrams et al., 2003; Killen et al., 2013; Nesdale et al., 2005) and group loyalty (e.g., Rutland & Killen, 2015). In line with this view, recent studies demonstrated that racial bias emerges in early childhood when the external or structural causes of social differences between groups are made explicit (e.g., Elenbaas et al., 2020; Vasilyeva et al., 2018). Other researchers found that White 10-month-old infants accepted toys equally from White and Black individuals, White 2.5-year-old children were equally likely to give a toy to an unfamiliar White or Black adult, and White 5–6-year-old children expressed race-based social preferences (Kinzler & Spelke, 2011). These findings suggested that social preferences based on race emerge between 2.5 and 5 years of age. Moreover, other research has demonstrated that children associate social class and race, and link White people with wealth and Black people with poverty (Elenbaas et al., 2022; Mandalaywala et al., 2020; Newheiser & Olson, 2012; Rizzo & Killen, 2020), supporting that group status can moderate in-group preferences from childhood and early adolescence (Ghavami & Mistry, 2019).

One other series of studies has demonstrated that school-aged children's reasoning on another child's positive and negative intentions was affected by the race of the protagonist, especially in homogeneous school contexts (Aboud, 1993; Margie et al., 2005; McGlothlin & Killen, 2005, 2006, 2010). These findings demonstrated relationships between social experiences (i.e., intergroup experiences) and evaluation processes. Prior studies assessed explicit intergroup attitudes by using forced-choice trait assignment (i.e., children are asked to assign positive and negative adjectives to pictures of White or Black characters) (McGlothlin & Killen, 2010). Although these studies provided evidence regarding how children's evaluations are influenced by the race of the protagonists and rely on social experiences, research on toddlers' race-based evaluations has not been conducted.

There is a rich literature on infants' evaluations of distributive actions, starting from 4-month-olds (Buyukozer Dawkins et al., 2019; Geraci & Surian, 2023b), as well as on the early selection of social partners affected by the race of distributors and recipients (Burn & Sommerville, 2014; Renno & Shutts, 2015). In particular, some researchers investigated early expectations of distributive actions by manipulating the membership of both recipients and distributors through similarity between agents, such as the same appearance (Bian et al., 2018). Crucially, they found that infants and toddlers expect individuals to reserve limited resources for in-group members (Bian et al., 2018). These findings support that when infants represent individuals as members of the same group, the principle of in-group support is triggered, and guides their expectations in scenarios displaying different prosocial actions (Bian & Baillargeon, 2022; Jin & Baillargeon, 2017; Ting et al., 2019).

Studies on childhood found that from 3 years of age, children prioritized in-group members for access to resources, and from 10–11 years they judged the resource inequality negatively and allocated more resources to the disadvantaged recipients (Elenbaas et al., 2016, 2022). These findings support that with age, children develop reasoning that aims for equality and tends to correct disparities, revealing marked age differences in perceptions, preferences, and reasoning about social class, race, and fairness during childhood. To date, it is unknown whether evaluations of distributive actions may be affected by racial bias when protagonists are evaluated directly by attributing the responsibility of negative or positive outcomes (i.e., fair or unfair distribution of resources).

Recently, several evolutionary scientists shed light on how the relationship between ecology, resource distributions, and intergroup tolerance in mammals in general, and primates specifically, provide useful insights (Spikins et al., 2021). In particular, in ecological contexts, where resources are highly clustered and critical for survival, intergroup coalition may be particularly key to enabling access (Pisor & Surbeck, 2019; Potts et al., 2018). Tolerance enables the exploitation of resources at boundaries whilst avoidance or aggression makes such exploitation impossible. To our best knowledge, no study explored whether young children are sensitive to intergroup coalitions in a context displaying fair and unfair distributions of resources, by manipulating the race of distributors and recipients.

Thus, the principal aim of the present study was to investigate whether toddlers' attributions of outcomes of distributive actions were (i) affected by the race of the protagonist, and (ii) sensitive to intergroup tolerance by using drawings (Experiment 1) and real photographs (Experiments 2 and 3), and (iii) to explore the developmental shift of racial bias by assessing an older sample (Experiment 4).

To address this research question, we presented toddlers with familiarization events displaying distributive actions performed by two hidden distributors (i.e., not visible and covered by a gray box) and later with a forced-choice character assignment (i.e., toddlers are asked to assign positive and negative outcomes to pictures of White or Black faces). To reduce a possible influence of the in-group support principle between recipients and distributors of the same group, in Experiments 1–2 recipients and distributors are different for membership, so the two receivers were represented by two different animal puppets (i.e., a cow and a pig) (like in Geraci & Surian, 2011, 2023b), while the two distributors were represented by two different human faces (i.e. drawings or photographs). Two additional experiments were carried out to replicate and extend the results of Experiment 2, so toddlers (Experiment 3) and children (Experiment 4) were presented with a new scenario, in which both distributors and recipients were represented by real photographs, and, in particular, the two recipients were represented by two White faces.

We hypothesized that toddlers' pro-White/anti-Black "favoritism" would be present in line with prior findings on infants' visual preferences for own-race faces (Quinn et al., 2020; for review see Anzures et al., 2013), so during the evaluation of distributive actions they would attribute positive outcomes to White faces, or otherwise, positive or negative outcomes at random (Margie et al., 2005; McGlothlin & Killen, 2005, 2006, 2010; see also Kinzler & Spelke, 2011).

This research was carried out following the ethical standard of the Declaration of Helsinki, and approved by the Research Ethics Committee of the Roma Tre University.

2 | EXPERIMENT 1

2.1 | Power analyses

No previous study on toddlers' race bias was available to obtain the measured effect size for this study, so it was chosen following a conservative tendency. A priori power analysis in G*Power (Faul et al., 2009) was performed for the binomial test employed in both reaching preference and reward allocation tasks (generic binomial test with proportions of $p_1 = .30$ and $p_2 = .70$, the statistical power of at least .80, and an alpha level of .05). From this analysis, a sample of 13 participants is needed. An additional power analysis was performed for McNemar's test, using the odd ratio and the proportion expected to change, a two-tailed, 3.0 effect size at an alpha of .05, 80% power and 75% of the proportion of the population changing, 40 participants would be needed to detect the effect. Thus to achieve the pre-specified power we recruited 40 participants for the four experiments.

2.2 | Participants

Forty healthy toddlers participated (2.5-year-olds: $N = 40$; $M_{\text{age}} = 30$ months and 8 days; range = 28 months and 3 days to 36 months and 8 days; 21 males). They were recruited from a day nursery in an urban area of Southern Italy, and they were White (100%) since the local population consists mainly of White individuals. Toddlers attended an ethnically homogeneous nursery school, in line with the procedure used in prior studies on racial attitudes in young children (Aboud, 2003; McGlothlin & Killen, 2006). We asked the children's parents to complete a questionnaire to provide information about the children's date of birth, gender, development, and family information. According to the information given by their parents, all children had typical development of social, verbal, motor, and cognitive skills. The families' SESs, measured with Hollingshead's (1975) Four-Factor Index, reflected middle-high class ($SES_{\text{tot}} = 54$). Two additional children were tested and excluded from the analysis because they did not follow familiarization events.

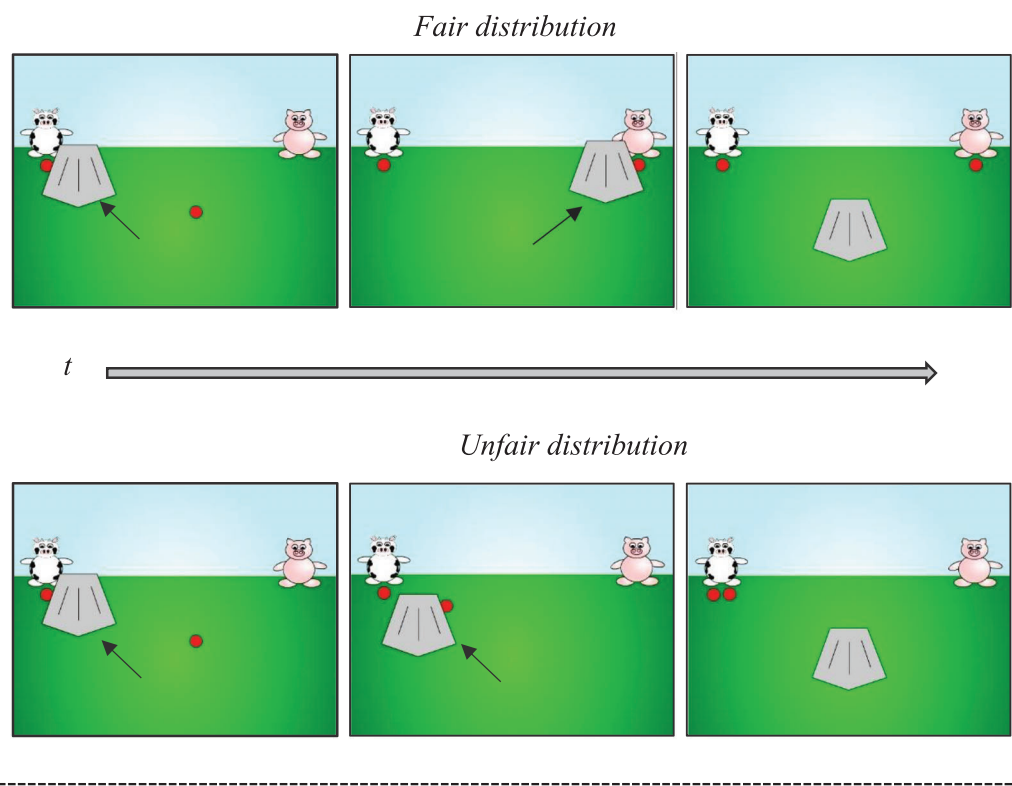
2.3 | Apparatus

The experiment was conducted in a quiet room of a nursery school. The stimuli were presented on a 14-inch monitor via a laptop. Toddlers were seated on a little chair, 60 cm from the monitor, while the experimenter was behind a white curtain and controlled the stimuli presentation using a mouse.

2.4 | Stimuli and procedure

Familiarization events were aimed at providing toddlers with information about distributive actions and outcomes. In each familiarization event, children were shown three agents that were represented by different animal figures in a scenario characterized by a green lawn (i.e., a bucolic scenario like in Geraci & Surian, 2011, 2023a). At the start of each event, following an attractive sound, toddlers saw the distributor that was covered by a gray box and placed in the center of the lawn with two apples. Then, the other two agents (i.e., cow and pig) autonomously entered the scene from the sides of the screen, one from the left and one from the right side of the screen. In the "fair distribution" the distributor gave an apple to each of the two receivers. In the "unfair distribution" the distributor gave the second apple to the same receiver, giving two apples only to one of the two receivers (see Figure 1a). In the unfair distribution, the recipient that received the two apples is the same animal each time. The duration of each familiarization event was 16 s. The order presentation of familiarization events (i.e., fair distribution vs unfair distribution) was counterbalanced across subjects. Following each familiarization event, toddlers were presented with a forced-choice task.

(a) Familiarization events



(b) Forced-choice task

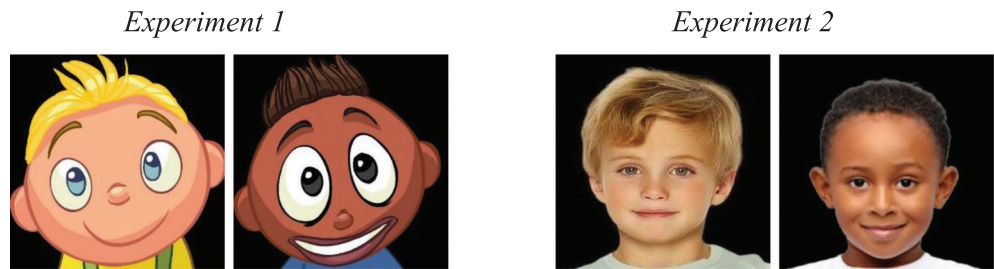


FIGURE 1 Schematic illustrations of familiarization events (a) and pictures used in the forced-choice task in Experiments 1–2 (b).

A second experimenter, blind to the familiarization events, held the pictures in front of the toddlers, approximately 30 cm apart and initially out of reach. Children were shown two 10 cm × 13 cm drawings showing White and Black faces (i.e., cartoon faces; adapted pictures from <https://www.pngegg.com>) (see Figure 1b). All drawings depicting faces were presented against a black background, and in frontal orientation with a slightly smiling expression. These pictures were placed in front of the toddlers using a 50 cm × 30 cm dark-gray foam tray. Toddlers were required to look at both pictures while these were out of reach and later to choose one of the two; once they did so, the shapes were moved within reach. The experimenter asked: “Which of the two characters did this? Pick it up!”. She looked at the toddler during the verbal request and then moved her gaze to the center of the black foam tray. The choice was determined online by the experimenter as the first picture that toddlers contacted with a visually-guided manual reach. Face gender was

matched to participant gender (cf. Elenbaas et al., 2022), while the age range of the children shown on the photographs was from 7 to 8 years, since 8-year-olds distribute resources equally with others (Malti et al., 2016).

2.5 | Results

Fair distribution of resources. Multiple linear regression was used to test if toddlers' gender and SES significantly predicted their responses. The overall regression was not statistically significant ($R^2 = .018$, $F(2, 37) = .344$, $p = .711$). It was found that the gender of participants ($\beta = .004$, $p = .981$) and SES ($\beta = .003$, $p = .413$) did not significantly predict toddlers' choices. Seventeen toddlers chose the Black face (45.5%; $p = .429$, binomial test, two-tailed; small Cohen's $g = .08$, see Cohen, 1988) (see Figure 2a). There was no significant effect of order presentation (fair vs. unfair distribution) on these choices ($\chi^2(1, 40) = .102$, $p = .749$).

Unfair distribution of resources. Multiple linear regression was used to test if toddlers' gender and SES significantly predicted their responses. The overall regression was not statistically significant ($R^2 = .004$, $F(2, 37) = .069$, $p = .933$). It was found that the gender of participants ($\beta = .049$, $p = .769$) and SES ($\beta = .001$, $p = .804$) did not significantly predict toddlers' choices. Twenty-two toddlers chose the Black face (55%; $p = .635$, binomial test, two-tailed; negligible Cohen's $g = .05$, see Cohen, 1988) (see Figure 2a). There was no significant effect of order presentation (fair vs. unfair distribution) on these choices ($\chi^2(1, 40) = 1.616$, $p = .204$).

In an exact McNemar's test, we found that 10 toddlers attributed the fair distribution to the Black face and the unfair distribution to the White face, whereas 15 toddlers did the opposite and attributed the fair distribution to the White face and the unfair distribution to the Black face ($p = .424$; 7 toddlers attributed both kinds of distributions to Black faces and 8 toddlers attributed both distributions to White faces) (data S1).

2.6 | Discussion

From these results, toddlers' attributions of distributive actions were not affected by the race of the protagonist, supporting the theoretical view according to which the development of racial concepts builds from social experiences and increases with growth (Elenbaas et al., 2016, 2020, 2022; Lee et al., 2017; Raabe & Beelmann, 2011; Rizzo & Killen, 2020; Vasilyeva et al., 2018).

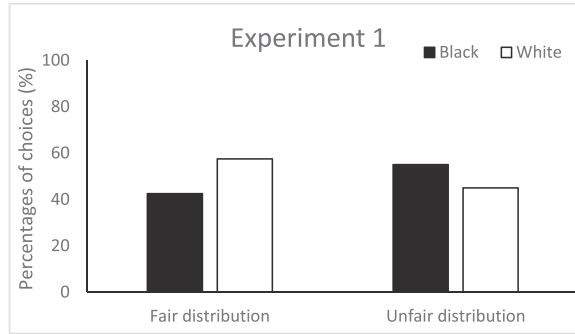
Reflecting on our stimuli, we noted that in infant studies researchers used photographs of real faces (Bar-Haim et al., 2006; Kelly et al., 2007, 2009; Quinn et al., 2020; Sugden & Marquis, 2017; for review see Anzures et al., 2013). Moreover, it is well-known that the realism of a photograph provokes more emotional reactions than a drawing in preschool age (Lee et al., 2017), and is more useful than a drawing for de-categorization interventions (Cameron & Rutland, 2008). Thus, we carried out a second experiment to assess whether the use of photographs stimulates mostly toddlers' reactions (Guerrero et al., 2010).

3 | EXPERIMENT 2

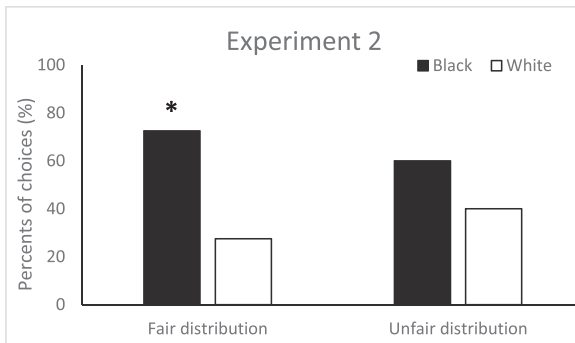
3.1 | Participants

Forty healthy toddlers participated (2.5-year-olds: $N = 40$; Mage = 34 months and 9 days; range = 28 months and 4 days to 36 months and 5 days; 25 males). They were recruited from a day nursery in an urban area of Southern Italy, they were White (100%) and attended an ethnically homogeneous nursery school. We asked the children's parents to complete a questionnaire to provide information about the children's date of birth, gender, development, and family information. According to the information given by their parents, all toddlers had typical development of social, verbal,

(a) Experiment 1: Drawings



(b) Experiment 2: Photographs



(c) Experiment 3: Photographs

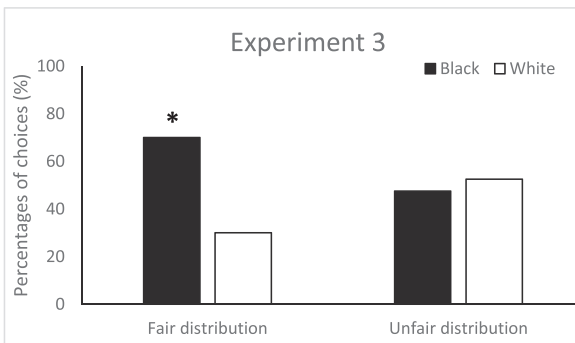


FIGURE 2 Toddlers' choices in Experiments 1–3. Significant results are indicated by an asterisk (* $p < .05$).

motor, and cognitive skills. The families' SESs, measured with Hollingshead's (1975) Four-Factor Index, reflected middle-high class ($SES_{tot} = 53$). Three additional children were tested and excluded from the analysis because they did not follow familiarization events. All parents had given written consent and received printed information about this research.

3.2 | Apparatus, stimuli, and procedure

Apparatus, stimuli, and procedure were like Experiment 1, with the exception that the drawings of faces were replaced by photographs of child faces with the same features: age, facial expression, size, and frontal gazes. The faces differ only

in ethnicity-related phenotypic features (i.e., the color of skin, eyes, and hair; shape of lips, hair, and nose). Toddlers were shown two 10 cm x 13 cm photographs showing White and Black faces (i.e., real faces; photographs from <https://www.pngegg.com>). Photographs of attractive faces were selected by considering symmetry and averageness (Little et al., 2011). Face gender was matched to participant gender (cf. Elenbaas et al., 2022). Moreover, the two faces were presented against a black background, and in frontal orientation with a slightly smiling expression (see Figure 1b).

3.3 | Results

Fair distribution of resources. Multiple linear regression was used to test if toddlers' gender and SES significantly predicted their responses. The overall regression was not statistically significant ($R^2 = .048$, $F(2, 37) = .925$, $p = .406$). It was found that the gender of participants ($\beta = .198$, $p = .215$) and SES ($\beta = .002$, $p = .679$) did not significantly predict toddlers' choices. Twenty-nine toddlers chose the Black faces (72.5%; $p = .006$, binomial test, two-tailed; medium Cohen's $g = .22$, see Cohen, 1988) (see Figure 2b). There was no significant effect of order presentation (fair vs. unfair) on these choices ($\chi^2(1, 40) = 1.129$, $p = .288$).

Unfair distribution of resources. Multiple linear regression was used to test if toddlers' gender and SES significantly predicted their responses. The overall regression was not statistically significant ($R^2 = .061$, $F(2, 37) = 1.201$, $p = .312$). It was found that the gender of participants ($\beta = .260$, $p = .137$) and SES ($\beta = .001$, $p = .848$) did not significantly predict toddlers' choices. Twenty-four toddlers chose the Black faces (60%; $p = .268$, binomial test, two-tailed; small Cohen's $g = .10$, see Cohen, 1988) (see Figure 2b). There was no significant effect of order presentation (fair vs. unfair) on these choices ($\chi^2(1, 40) = .417$, $p = .519$).

In an exact McNemar's test, we found that 10 toddlers attributed the fair distribution to the Black face and the unfair distribution to the White face, whereas 5 toddlers did the opposite and attributed the fair distribution to the White face and the unfair distribution to the Black face ($p = .302$; 19 toddlers attributed both kinds of distributions to Black faces and 6 toddlers attributed both distributions to White faces) (data S2).

3.4 | Further analysis

Fair distribution of resources. The patterns of choices of Experiments 1 and 2 were significantly different, $\chi^2(1, 80) = 7.366$, $p = .007$, $\phi = .303$.

Unfair distribution of resources. The patterns of choices of Experiments 1 and 2 were not significantly different, $\chi^2(1, 80) = .205$, $p = .651$, $\phi = .050$.

3.5 | Discussion

Surprisingly, White toddlers showed a tendency to attribute a fair distribution of resources to Black characters, extending prior literature on scholarly children's expectations of peers' positive and negative intentions that resulted in being affected by the race of the protagonist (Margie et al., 2005; McGlothlin & Killen, 2005, 2006, 2010). Our findings extend the literature on the development of intergroup attitudes and racial concepts (Elenbaas et al., 2020; Raabe & Beelmann, 2011; Rizzo & Killen, 2020; Vasilyeva et al., 2018), revealing the lack of a racial bias among White toddlers from a racially homogeneous environment.

Moreover, these results indicate that toddlers' responses are affected by the type of material (i.e., photographs) (Guerrero et al., 2010), and from the details provided by the photographs that portray the real phenotypes of Black or White faces (Dunham et al., 2015). Crucially, the results of Experiments 1 and 2 support that photographs can be more useful than drawings to investigate race-based evaluations of prosocial actions in toddlerhood since they can activate

better evaluative and attitudinal components (Cunningham & Odom, 1986; Guerrero et al., 2010). To replicate the results of Experiment 2, and to rule out the possible explanation according to which the toddlers' responses were due to the perceptual features of the two photographs used in Experiment 2, an additional experiment was carried out by using a new scenario in which both distributors and receivers were represented by other photographs. In particular, the recipients were replaced by two White children, in line with the more widespread race of the local population where data was collected.

4 | EXPERIMENT 3

4.1 | Participants

Forty healthy toddlers participated (2.5-year-olds: $N = 40$; $M_{age} = 32$ months and 10 days; $range = 29$ months to 36 months and 1 day; 22 males). They were recruited from a day nursery in an urban area of Southern Italy, they were White (100%) and they attended an ethnically homogeneous nursery school. We asked the children's parents to complete a questionnaire to provide information about the children's date of birth, gender, development, and family information. According to the information given by their parents, all children had typical development of social, verbal, motor, and cognitive skills. The families' SESs, measured with Hollingshead's (1975) Four-Factor Index, reflected middle-high class ($SES_{tot} = 53.1$). All parents had given written consent and received printed information about this research.

4.2 | Apparatus, stimuli, and procedure

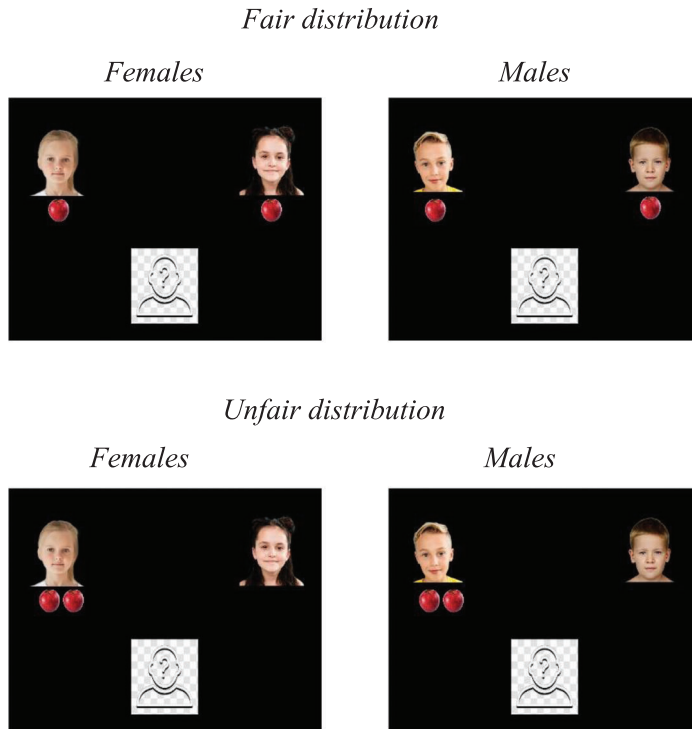
Apparatus, stimuli, and procedure were like in Experiment 1, with the exceptions that (i) both recipients and distributors were replaced with real photographs, and (ii) the background was neutral and black (see Figure 3). Thus, toddlers were shown four 10 cm x 13 cm photographs showing White and Black faces (i.e., real faces; photographs from <https://www.pngegg.com>). Like in Experiment 2, face gender was matched to participant gender, and the age range of the children shown on the photographs was from 7 to 8 years. All photographs of attractive faces were selected by considering symmetry and averageness. The race of the two receivers was matched to the racial group of the participants (i.e., White).

4.3 | Results

Fair distribution of resources. Multiple linear regression was used to test if toddlers' gender and SES significantly predicted their responses. The overall regression was not statistically significant ($R^2 = .051$, $F(2, 37) = .999$, $p = .378$). It was found that the gender of participants ($\beta = .016$, $p = .913$) and SES ($\beta = .007$, $p = .166$) did not significantly predict toddlers' choices. Twenty-eight toddlers chose the Black faces (70%; $p = .017$, binomial test, two-tailed; large Cohen's $g = .34$, see Cohen, 1988) (see Figure 2c). There was no significant effect of order presentation (fair vs. unfair distribution) on these choices ($\chi^2(1, 40) = 1.231$, $p = .267$).

Unfair distribution of resources. Multiple linear regression was used to test if toddlers' gender and SES significantly predicted their responses. The overall regression was not statistically significant ($R^2 = .016$, $F(2, 37) = .293$, $p = .748$). It was found that the gender of participants ($\beta = .097$, $p = .560$) and SES ($\beta = .003$, $p = .613$) did not significantly predict toddlers' choices. Nineteen toddlers chose the Black faces (47.5%; $p = .875$, binomial test, two-tailed; negligible Cohen's $g = .03$, see Cohen, 1988) (see Figure 2c). There was no significant effect of order presentation (fair vs. unfair) on these choices ($\chi^2(1, 40) = .852$, $p = .356$).

(a) Familiarization events



(b) Forced-choice task

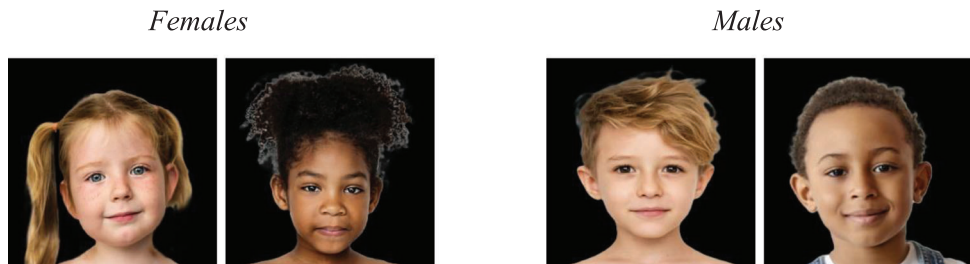


FIGURE 3 The final frames of the familiarization events (a), and pictures used in the forced-choice task (b) in Experiments 3–4.

In an exact McNemar's test, we found that 15 toddlers attributed the fair distribution to the Black face and the unfair distribution to the White face, whereas six toddlers did the opposite and attributed the fair distribution to the White face and the unfair distribution to the Black face ($p = .078$; 13 toddlers attributed both kinds of distributions to Black faces and 6 toddlers attributed both distributions to White faces) (data S3).

4.4 | Further analysis

Fair distribution of resources. The patterns of choices of Experiments 2 and 3 were not significantly different, $\chi^2(1, 80) = .805, p = .061, \phi = .027$.

Unfair distribution of resources. The patterns of choices of Experiments 2 and 3 were not significantly different, $\chi^2(1, 80) = 1.257, p = .262, \phi = .125$.

4.5 | Discussion

These results replicated those of Experiment 2 because toddlers showed the same tendency to attribute positive intentions to other-race characters, extending prior literature supporting that racial concepts emerge in childhood (Elenbaas et al., 2020; Raabe & Beelmann, 2011; Rizzo & Killen, 2020; Vasilyeva et al., 2018). In both Experiments 2 and 3 toddlers chose significantly the Black over the White distributors in the fair distribution of resources. Anyway, a general pro-Black racial bias seems to be evident, given the lack of significant difference between the two conditions.

Moreover, by comparing these results with those of Experiment 2, we note that toddlers' attributions (i.e., choices) appear not to be driven by an in-group support principle, since in both experiments toddlers showed the same significant tendency to attribute fair distributions of resources to Black distributors. Thus, these findings shed light on the fact that if an abstract principle of ingroup support guides infants' sociomoral reasoning (Bian & Baillargeon, 2022; Ting et al., 2019), this does not indicate the presence of a racial bias (i.e., a prejudice) in the second year of life.

To know the developmental trajectory of this bias, and to explore how this forced-choice task is interpreted from older children, an additional experiment was carried out by assessing 7-year-olds, according to prior findings revealing that by 5–7 years of age, children manifested race-based social preferences (Kinzler & Spelke, 2011).

5 | EXPERIMENT 4

5.1 | Participants

Forty healthy school-aged children participated (7-year-olds: $N = 40$; $M_{age} = 85$ months and 20 days; $range = 83$ months to 93 months and 3 days; 16 males). They were recruited from a primary school in an urban area of Southern Italy, they were White (100%) and they attended an ethnically homogeneous primary school. We asked the children's parents to complete a questionnaire to provide information about the children's date of birth, gender, development, and family information. According to the information given by their parents, all participants had typical development of social, verbal, motor, and cognitive skills. The families' SESs, measured with Hollingshead's (1975) Four-Factor Index, reflected middle-high class ($SES_{tot} = 52.7$). All parents had given written consent and received printed information about this research.

5.2 | Apparatus, stimuli, and procedure

Apparatus, stimuli, and procedure were like in Experiment 3 (see Figure 3).

5.3 | Results

Fair distribution of resources. Multiple linear regression was used to test if children's gender and SES significantly predicted their responses. The overall regression was not statistically significant ($R^2 = .043, F(2, 37) = .835, p = .442$). It was found that the gender of participants ($\beta = .151, p = .317$) and SES ($\beta = .004, p = .294$) did not significantly predict children's choices. Thirty children chose the White faces (75%; $p = .002$, binomial test, two-tailed; large *Cohen's g* = .25, see Cohen, 1988) (see Figure 4). There was no significant effect of order presentation (fair vs. unfair) on these choices ($\chi^2(1, 40) = .533, p = .465$).

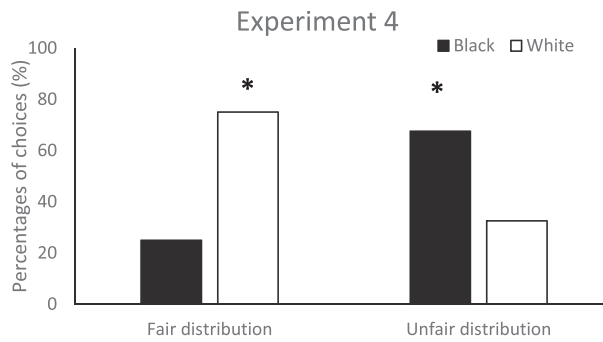


FIGURE 4 Seven-year-old children's choices in Experiment 4. Significant results are indicated by an asterisk (* $p < .05$).

Unfair distribution of resources. Multiple linear regression was used to test if children's gender and SES significantly predicted their responses. The overall regression was not statistically significant ($R^2 = .022$, $F(2, 37) = .009$, $p = .991$). It was found that the gender of participants ($\beta = .019$, $p = .906$) and SES ($\beta = .001$, $p = .978$) did not significantly predict children's choices. Twenty-seven children chose the Black faces (67.5%; $p = .038$, binomial test, two-tailed; negligible Cohen's $g = .17$, see Cohen, 1988). There was no significant effect of order presentation (fair vs. unfair) on these choices ($\chi^2(1, 40) = .114$, $p = .736$).

In an exact McNemar's test, we found that 23 children attributed the fair distribution to the White face and the unfair distribution to the Black face, whereas 6 children did the opposite and attributed the fair distribution to the Black face and the unfair distribution to the White face ($p = .003$; 4 children attributed both kinds of distributions to Black faces and 7 children attributed both distributions to White faces) (see Figure 4; data S4).

5.4 | Further analysis

Fair distribution of resources. The patterns of choices of Experiments 3 and 4 were significantly different, $\chi^2(1, 80) = 16.241$, $p = .001$, $\phi = .450$.

Unfair distribution of resources. The patterns of choices of Experiments 3 and 4 were not significantly different, $\chi^2(1, 80) = 1.875$, $p = .171$, $\phi = .153$.

5.5 | Discussion

The current data supported prior findings for which intergroup attitudes and racial concepts emerge in childhood (Elenbaas et al., 2020; Raabe & Beelmann, 2011; Rizzo & Killen, 2020; Vasilyeva et al., 2018). These results provide evidence for a late-emerging pro-White/anti-Black racial bias, differently from the results of Experiments 2 and 3 revealing an early-emerging pro-Black racial bias. Crucially, 7-year-old children's attributions were significantly different in the two conditions, since a pro-White bias was found in the fair distribution and an anti-Black bias in the unfair distribution, supporting previous findings that indicated a peak of racial prejudice in middle childhood (i.e., 5–7 years; Kinzler & Spelke, 2011; Raabe & Beelmann, 2011).

6 | GENERAL DISCUSSION

In the present study, we explored whether and how racial bias affects race-based evaluations of distributive actions in toddlerhood. After seeing each familiarization event displaying distributive actions performed by a hidden distributor,

toddlers were presented with a forced-choice character assignment, in which they were asked to attribute positive and negative outcomes to one of the two protagonists represented by pictures of White or Black faces. The current results demonstrated that toddlers' evaluations are driven by a "pro-Black bias," only when they were presented with a forced-choice character assignment displaying photographs (Experiments 2–3) and not drawings of faces (Experiment 1). Conversely, 7-year-old children demonstrated a pro-White/anti-Black racial bias when they were presented with the same forced-choice character task displaying photographs (Experiment 4). In addition, the present study demonstrated that the kind of material affects toddlers' socio-cognitive responses since photographs proved to be more useful than drawings of faces to activate better evaluative and attitudinal components (Cunningham & Odom, 1986; Guerrero et al., 2010). An interesting point concerns the presence of an early "pro-Black bias" when White toddlers have to choose between White and Black protagonists, by attributing a positive outcome (i.e., fair distribution of resources).

Why should toddlers attribute an equal distribution to a distributor belonging to a different racial group (with a different skin color)?

The first explanation is that toddlers do not yet have acquired *negative stereotypes* about the outgroups, in line with prior findings revealing that outgroup negativity is late emerging (McGlothlin & Killen, 2010; McKown & Weinstein, 2003). From a developmental perspective these results confirm the lack of a racial bias in the second year of life, and support the claim that no part of the human cognitive architecture is designed specifically to encode race, which can be defined as a 'construct' (Kurzban et al., 2001).

A second explanation is that toddlers can have attributed positive outcomes (i.e., fair distribution of resources) to Black protagonists for a *social reason*: engaging in intergroup coalitions. There are two reasons to support this view. First, recent infant studies provide evidence for the lack of racial concepts (i.e., negative prejudices), confirming prior evidence that social preference based on race emerges between 2.5 and 5 years of age (Kinzler & Spelke, 2011). In their seminal study, Kinzler and Spelke (2011) found that 2.5-year-olds gave toys equally to own- and other-race individuals, while 5-year-olds manifested a preference for own-race individuals. Thus, racial concepts seem to be late-emerging, and so they do not affect social preference in the first 2 years of age (Geraci et al., 2022; Kinzler & Spelke, 2011; Powell, 2022).

Second, from an evolutionary perspective, in ancestral environments, the features of visual appearance that distinguish members of different racial groups today were likely of little value in distinguishing members of neighboring coalitions, especially before the long-distance migrations (Cosmides et al., 2003). Thus, patterns of cooperation and competition would have served as good predictors of coalitional group membership across different social groups (Cosmides et al., 2003; Olson & Spelke, 2008; Potts et al., 2018; Rodrigues et al., 2023; Spikins et al., 2021).

Thus, the present data supports that toddlers are predisposed to intergroup coalitions, especially when they have to judge others by attributing the responsibility of important actions for survival (i.e., distribution of resources). Moreover, these results support that photographs can be more useful than drawings in investigating racial concepts, and also the intergroup coalition since only photographs depicting White or Black human faces trigger intergroup reasoning (Cunningham & Odom, 1986; Guerrero et al., 2010).

Overall, the current results support the developmental view that infants possess a rich moral sense, which has evolved to sustain cooperative systems (for a review see Woo et al., 2022). Indeed, from 3 to 4 months of age, infants evaluate different prosocial behaviors positively, demonstrating early-emerging altruism (Geraci & Surian, 2023b; Hamlin et al., 2007, 2010; see also Wynn et al., 2018). Crucially, these findings shed light on the absence of racial prejudice (i.e., pro-White/anti-Black bias) in the first two years of life, demonstrating an initial altruistic tendency (Hamlin, 2013; Wynn & Bloom, 2013; Wynn et al., 2018).

From a developmental perspective, toddlers and 7-year-old children's opposite responses demonstrate a late-emerging racial bias, supporting the role of cultural and social factors on the emergence of racial concepts (Aboud, 1993, 2003; Hirschfeld, 2008; Raabe & Beelmann, 2011; Yee et al., 2022) between early and middle childhood.

Finally, these findings speak about the importance of an early educational intervention aimed at reducing the emergence of prejudice, by promoting and fertilizing more adaptive concepts, such as interracial friendships (Rizzo et al., 2021), and fairness (Geraci et al., 2023).

Several limitations and considerations should be addressed in future work as well. A limitation of the current study is the lack of a Black sample, so one important next step is to directly assess other groups to compare their racial concepts. Prior research demonstrated low levels of racial biases in children of color living in the United States as compared to White children (Dunham et al., 2013), and also young Black children's mixed or equal racial group preferences (Newheiser & Olson, 2012; Renno & Shutts, 2015). Additional studies could explore toddlers' racial bias and a possible tendency for intergroup coalitions in a Black sample.

The generalization of findings is limited by the White sample enrolled in ethnically homogeneous schools, but future studies could investigate how a heterogeneous classroom affects toddlers' responses, by exploring whether and how constant exposure to other-race peers affects the emergence of racial bias in toddlers. In particular, some recent studies have found a pro-White/anti-Black racial bias in contexts where both Black and White children and adults are racial minorities (Qian et al., 2016, 2019). To our best knowledge, no study has explored toddlers' racial bias in a context where Black and White children were racial minorities. Furthermore, longitudinal studies are needed to explain age differences in social evaluations of cross-race interactions.

In sum, these findings support recent developmental views, in particular those demonstrating that children's beliefs and attitudes about race are built from their experiences and increase with growth, and others support early emerging altruism, which reflects an innate moral core. Thus, by reflecting on adults and recent world news on racism, we can believe in a possible negative influence of social environment across development, and so we could find ourselves agreeing with Martin Luther King, who remembered adults: "(...) We must learn to live together as brothers or we will perish together as fools." (M. Luther King, March 22, 1964 speech in St. Louis).

ACKNOWLEDGMENTS

We are grateful to all parents and toddlers who participated in the research. We also thank Francesca Galluccio, Anna Maria Praticò, and Giovanna Moncheda for helping to collect data.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest concerning the funding source for this study.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

ETHICS APPROVAL STATEMENT

In line with the Declaration of Helsinki, written informed consent was obtained from the toddlers' parents before the experiment was conducted. The procedure was approved by the ethics committee of the Roma Tre University.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Geraci, A., Commodari, E., & Perucchini, P. (2024). Early intergroup coalition: Toddlers attribute fair distributions to Black rather than White distributors. *Social Development*, e12740. <https://doi.org/10.1111/sode.12740>