Investigating the Influence of an Individuation Storybook in Early Childhood Education

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Honors Thesis

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December, 2025

Abstract

Racial bias refers to preferences or judgments based on race, often developing in early childhood and shaping how children interact with others. Explicit bias involves conscious stereotypes and attitudes, while implicit bias operates unconsciously, influencing behavior without intent and being harder to change. Perceptual individuation training has shown promise in reducing implicit bias by teaching children to focus on unique features or interests rather than broad racial categories. Unlike mere exposure to diversity, individuation training actively promotes individual-level processing and has been demonstrated to significantly reduce implicit racial bias in preschoolers. Yet, most studies have occurred in controlled lab settings instead of real-world classrooms and there is little information on how to apply it in early education. This thesis assesses whether individuation tasks can be incorporated into a book-based intervention to reduce racial bias in preschoolers and whether such training can realistically be applied in preschool settings. Preschool children were randomly assigned to an individuation condition, where black characters were introduced with different interests, or to a mere exposure condition, where black and own race characters shared the same interest. Changes in implicit racial bias were measured using a preschool-friendly Implicit Racial Bias Test (IRBT) administered before and after the intervention. Results indicated that implicit bias scores increased from pre- to post-test across both conditions, and the individuation activity did not produce greater reductions in bias relative to mere exposure. Exploratory analyses suggested, however, that children with higher community diversity exposure (q2) showed smaller absolute changes in bias, pointing to the potential stabilizing role of real-world diversity experiences.

Reducing Racial Bias in Preschoolers

Children begin to notice race and form biases early, which shape how they interact with others and perceive the world around them (Greenwald & Banaji., 1995). Children recognize racial categories by 3, and demonstrate in-group favoritism by 5 (Aboud, 2008). Given that biases form at a young age, early childhood education plays a key role in shaping children's racial attitudes (Umaña-Taylor & Hill, 2020). Exposure to diverse curricular materials in elementary school is associated with lower racial bias (Gaias et al., 2018). However, early childhood classrooms in the U.S. often reflect the same racial divides seen in the rest of society, making it harder for kids to interact with peers from different backgrounds (Bonilla-Silva, 2017).

Racial biases can take implicit or explicit forms. Implicit bias refers to unconscious stereotypes and prejudice, while explicit bias refers to conscious racial stereotypes and discriminatory attitudes (Greenwald & Banaji, 1995; Aboud, 1988; Dovidio et al., 2002). Explicit bias can be shaped by teaching and social norms, while implicit bias is more robust and requires attentive intervention. Implicit biases in adults are unconscious and, therefore, more challenging to measure, but they have long been known to be present even in young children. In the classic Clark and Clark (1947) doll study, preschoolers labeled White dolls with positive attributes and Black dolls with negative attributes, demonstrating early racial preference.

A widely used method for assessing implicit bias in young children is the Implicit Racial Bias Test (IRBT), a preschool adaptation of the Implicit Association Test (IAT) commonly used for adults. The IRBT presents children with faces of different races paired with positive or negative expressions and measures differences in response time to determine bias (Qian et al., 2016). If a child takes longer to associate Black faces with a positive expression than White faces, thus indicates an implicit bias against Black faces. Unlike traditional IATs, the IRBT

minimizes cognitive load, allowing young children to complete the task using only visual cues rather than verbal comprehension or reading skills.

Exposure to diversity has been a common approach to reduce bias. The Mere Exposure theory is that the more children see people from different racial backgrounds, the more likely they are to feel positive about them and show less in-group preference (Zajonc, 1968). Children who grow up in more diverse environments tend to accept people from different racial groups more and show weaker in-group biases (Sangrigoli et al., 2005). However, just being exposed to diversity is not enough to reduce racial bias, children need help recognizing individual traits, or they may continue relying on racial stereotypes (Qian et al., 2017).

Perceptual individuation training is a more effective way to reduce racial bias than simple exposure, teaching children to recognize individuals based on unique facial features such as eye shape, nose size, or face structure rather than broad racial categories (Qian et al., 2016). By actively comparing differences between faces, children become better at distinguishing individuals and are less likely to rely on racial cues. Although individuation training has shown strong results in controlled settings, little research has examined how it can be applied in preschool classrooms. Many schools adopt colorblind approaches, assuming that avoiding race discussions reduces bias, but research shows that ignoring race often reinforces inequality by allowing stereotypes to persist (Bonilla-Silva, 2017; Pahlke et al., 2012; Pollock, 2005). These challenges highlight the need to explore strategies like individuation training that can be feasibly implemented in early education.

This study will test whether embedding individuation tasks into a book-based intervention reduces implicit and explicit racial bias in preschoolers and whether individuation is

more effective than mere exposure. The goal is to explore how these findings could inform practical, evidence-based strategies for reducing bias in real-world classrooms..

Current Literature

One of the earliest studies on racial bias in young children is the Clark and Clark (1947) doll study. This study aimed to understand how Black children viewed race and whether they internalized societal attitudes about skin color. The researchers presented four dolls to Black children between 3-7 years old, two with White skin and two with Black skin. The children were asked: "Which doll do you like best?" "Which doll looks like you?", "Which doll is the nice doll?", "Which doll is the bad doll?". Many children preferred the White doll when asked which one was nice or which they liked best, while the Black doll was more often considered “bad”. When asked which doll looked most like them, some Black children hesitated or even identified the White doll, suggesting that they may have internalized negative societal views about their own racial identity. The Clarks saw these responses as proof that young children learn and reflect racial biases from society.

Despite its prominence, the Clark and Clark (1947) study has faced criticism. Katz and Zalk (1974) questioned its longitudinal validity, suggesting that a child's doll choice at one moment does not necessarily predict long-term racial attitudes. Katz and Zalk found that young children tend to associate the color black with negative objects and situations while associating the color white with positive ones. This finding implies that children's racial attitudes are influenced by societal color associations rather than stable, internalized preferences. Additionally, the original study did not account for social desirability bias; children might have selected the white doll not out of genuine preference but because they believed it was the "right"

answer based on societal expectations. The study also did not explore the underlying reasons for children's choices or consider influences from family, community, or educational environments.

Jordan and Hernandez-Reif (2009) expanded on Clark and Clark's work by addressing several of these limitations in their study of preschool-aged children's racial attitudes and skin tone preferences. Using a sample of both Black and White children aged 3 to 5, they implemented a computer-based task featuring cartoon characters with identical features except for skin tone, eliminating variables like hair or eye color. Children were shown pairs of characters ranging from very light to very dark skin tones and asked to choose their preferences. After this initial assessment, children listened to a moral story featuring a Black protagonist presented in a positive, heroic role. The researchers then reassessed children's preferences. Prior to the story, White children showed a strong preference for lighter skin tones, while Black children's preferences were mixed. After the intervention, Black children showed a significant shift toward preferring darker-skinned characters, suggesting that positive representation can influence their attitudes. However, White children did not show a significant shift toward preferring darker-skinned characters after the intervention; instead, they continued to show a preference for lighter skin tones. This study addresses the lack of intervention and control for confounding variables present in earlier research, offering evidence that young children's racial attitudes are malleable and can be shaped by targeted, positive exposure.

Implicit Racial Bias Test (IRBT)

Early research on racial bias in children, like the Clark and Clark (1947) doll study, relied on explicit measures to assess children's attitudes. In explicit tests, children are directly asked to state preferences or make evaluations, which may be influenced by social desirability pressures or the desire to align with adult expectations. These measures are especially vulnerable to

external influences, as young children may respond based on what they believe adults want to hear rather than expressing genuine attitudes. This recognition has led researchers to seek more reliable, implicit methods of assessing racial bias. Methods that tap into unconscious associations and reduce the influence of social pressures.

One of the most widely used implicit tools in adult populations is the Implicit Association Test (IAT). The IAT measures implicit biases by recording how quickly individuals categorize stimuli, typically pairing social groups (different races) with positive or negative attributes. Faster reaction times when pairing a particular racial group with positive attributes, and slower times for other groups, indicate implicit preferences. However, the IAT's reliance on reading ability, verbal comprehension, and complex instructions makes it unsuitable for young children with limited cognitive skills.

To address these limitations, Qian et al. (2016) developed the Implicit Racial Bias Test (IRBT), an adaptation of the IAT designed specifically for preschool-aged children. The IRBT reduces cognitive load by using simple, visually engaging stimuli without requiring reading or advanced verbal instruction. In the IRBT, children are shown faces from different racial groups, each paired with positive (smiling) or negative (frowning) facial expressions. Children are asked to categorize these faces by pressing buttons that correspond to happy or sad expressions. The test records reaction times and accuracy, providing an implicit measure of racial bias based on how quickly children associate positive or negative attributes with different racial groups. This simplified design allows researchers to capture implicit racial attitudes in young children while minimizing the risk of social desirability bias or cognitive strain.

The broader goal of these assessment tools is to understand how biases develop and identify strategies to reduce them. Several psychological theories support this approach. Social

cognitive developmental theories argue that children learn social categories and biases through observation and socialization processes (Bigler & Liben, 2006). Bigler et al. (2001) demonstrated this experimentally by assigning children to novel groups based on arbitrary distinctions. Even in the absence of meaningful differences, children displayed strong in-group favoritism, highlighting how easily social categorization fosters bias. Devine's (1989) Dissociation Model further suggests that implicit biases result from automatic associations learned early in life, while explicit attitudes are more consciously controlled. Research supporting this model shows that interventions targeting these automatic, unconscious processes, such as perceptual individuation training, are necessary to disrupt deeply rooted biases (Devine, 1989; Qian et al., 2017).

The Role of Exposure in Bias Reduction

Zajonc's (1968) Mere Exposure Theory holds that repeated exposure to unfamiliar stimuli, such as individuals from different racial groups, increases familiarity and leads to more positive attitudes. It proposes that repeated exposure to unfamiliar stimuli, including individuals from different racial groups, increases familiarity, which leads to more positive attitudes. Sangrigoli et al. (2005) tested this theory regarding face recognition and in-group bias. Researchers investigated whether exposing young children to faces from multiple racial groups would improve recognition abilities and decrease in-group favoritism. French Caucasian children aged between 4 and 6 years were recruited and shown images of both own-race and other-race faces repeatedly over several sessions. The children's ability to recognize faces was assessed before and after exposure using face-recognition tasks. Children were better at recognizing faces from other racial groups after repeated exposure, suggesting that mere exposure can improve perceptual recognition skills. Children who received this exposure also demonstrated weaker

in-group bias, supporting that familiarity with diversity may positively influence social preferences. This study provided early evidence that exposure to diverse faces can change perceptual and possibly attitudinal patterns in young children.

Pahlke et al. (2012) examined whether the racial diversity of a child's school and peer environment impacted racial bias. The researchers studied European American mothers and their preschool children to evaluate both parental socialization strategies and children's racial attitudes. The study utilized a combination of parent questionnaires about school diversity and parental approaches to discussing race alongside behavioral assessments of children's racial preferences, such as preference tasks involving choosing friends or playmates from photographs of children of different races. Results showed that school diversity alone did not significantly predict reduced racial bias in children. The presence of race-conscious discussions and deliberate engagement by parents were more closely associated with lower levels of bias. The authors concluded that passive exposure to racial diversity in schools without intentional conversations or structured activities did not effectively decrease children's biased attitudes. These findings highlight the limitations of mere exposure in shifting implicit biases, especially when not accompanied by guided engagement.

Qian et al. (2017) further tested the relative effectiveness of mere exposure in reducing implicit racial bias compared with individuation training. The study involved Chinese preschool children aged 4 to 6 randomly assigned to two conditions: a mere exposure group and an individuation training group. Both groups were exposed to the faces of Black and White individuals, but the mere exposure group passively viewed these faces, while the individuation group was taught to recognize and distinguish between individual faces by associating each face with a specific name. Children completed an adapted Implicit Association Test (IRBT) before

and after the intervention, measuring their implicit racial bias. Children in the mere exposure group showed no significant change in implicit bias following the exposure sessions. Their reaction times continued to reflect a preference for their in-group faces. In contrast, children who received individuation training demonstrated significantly reduced implicit racial bias, with post-intervention IAT scores not differing from zero, indicating no measurable bias. This experiment showed that passive exposure to diverse faces alone could not alter automatic, unconscious biases. Specifically training children to differentiate individual faces was necessary to produce meaningful change in bias.

The results above support that passive exposure alone has limitations in addressing the unconscious stereotypes children may already hold. Consistent with this, Pahlke et al. (2012) found that children's racial attitudes were unaffected by the racial diversity present in their schools without deliberate, race-conscious engagement. A meta-analysis by Pettigrew and Tropp (2006) demonstrated that contact with other races only reduces prejudice when interactions involve cooperation, equal status, and meaningful engagement, which are absent conditions in simple exposure scenarios. Qian et al. (2017) further confirmed that exposure without active individuation fails to reduce implicit bias in preschool children. These studies highlight the need for more structured, interactive strategies that go beyond passive exposure. Perceptual individuation training has demonstrated greater effectiveness in reducing racial bias and will be the focus of the following section.

Individuation as an Effective Intervention

Hugenberg, Miller, and Claypool (2007) define perceptual individuation training as a method designed to reduce racial bias by teaching individuals to focus on the unique characteristics of each face, rather than categorizing individuals solely by race. This approach

draws from social cognitive theories suggesting that when people individuate others based on specific features, they are less likely to rely on broad racial stereotypes. Individuation involves attending to person-specific information, such as distinct facial features, rather than making judgments based on group membership. This shift from category-based processing to feature-based processing reduces reliance on automatic racial categorization, which is one of the underlying contributors to racial bias.

Qian et al. (2017) tested the effectiveness of perceptual individuation training in reducing implicit racial bias in preschool-aged children. In their study, Chinese preschoolers aged 4 to 6 were randomly assigned to two conditions: an individuation training group and a mere exposure group. Both groups were shown faces of Black and White individuals, but the key difference lay in how these faces were presented. For the individuation group, four Black faces were each paired with distinct labels (names), and the children were explicitly trained to recognize and differentiate between these faces. The White faces were shown without labels. In the mere exposure group, the opposite was done: White faces were labeled individually, while Black faces were unlabeled. Before and after the intervention, children's implicit racial bias was measured using a preschool-friendly Implicit Association Test (IAT), which recorded reaction times as children associated positive or negative attributes with faces of different races. Results revealed that children who received individuation training showed a significant reduction in implicit racial bias, with post-training scores no longer differing significantly from zero. In contrast, children exposed to other-race faces without individuation continued to display significant bias, with implicit bias remaining unchanged toward White faces and increasing toward Black faces. Notably, individuation training eliminated implicit bias against White faces but only reduced, without fully eliminating, bias against Black faces. These findings demonstrate that training

children to recognize individual facial features within a racial group can effectively decrease implicit bias, whereas mere exposure without individuation does not produce the same effect.

Xiao et al. (2017) further explored individuation training's effectiveness in reducing bias in a cross-cultural context. Chinese preschoolers aged four to six participated in a study where they were introduced to both Black and White faces. Similar to Qian et al.'s design, children in the individuation condition were trained to recognize and identify individual faces of one racial group by associating each face with a distinct label. The study involved repeated face-recognition tasks where children practiced matching names to specific facial features over multiple sessions. Implicit racial bias was measured before and after the training using a child-friendly IAT. Results showed that children who underwent individuation training exhibited significantly lower levels of implicit racial bias compared to those who did not receive such training. The individuation group demonstrated improved recognition of the other-race faces and reduced bias, highlighting that actively engaging children in recognizing individual differences is critical for bias reduction.

Botto and Kerr (2024) investigated the application of individuation training within a preschool classroom setting through race-conscious reading activities. The study involved preschool-aged children who participated in storybook reading sessions that incorporated individuation tasks. During these sessions, children were encouraged to focus on the unique facial features of characters from diverse racial backgrounds, such as identifying eye shapes, skin tones, and other distinguishing traits. Teachers facilitated guided discussions that emphasized these features without reinforcing racial categories. The researchers measured outcomes by evaluating whether children engaged in conversations about race at school and at home. Findings showed that children who participated in the individuation-based reading activities were more

likely to have meaningful discussions about race and demonstrated increased awareness of individual differences. The study supports the practical implementation of individuation training in early childhood education, showing that it not only reduces bias but also fosters constructive dialogue about race.

Challenges and Gaps in Implementing Individuation in Education

Lack of Research on Real-World Implementation

Although perceptual individuation training has reduced racial bias in children, most studies have occurred in controlled lab environments rather than in actual classrooms. These studies typically involve one-on-one training, where researchers guide children through individuation tasks and closely monitor their responses. Two studies (Qian et al., 2016; Xiao et al., 2017) found that preschoolers who received structured individuation training showed lower levels of implicit racial bias and improved ability to distinguish other-race faces, respectively. However, both studies were conducted in controlled laboratory settings with repeated reinforcement, rather than in natural preschool environments.

Although studies have shown that perceptual individuation training can reduce implicit racial bias in laboratory settings (Qian et al., 2017; Xiao et al., 2015; Lebrecht et al., 2009), no research has yet examined how this training can be implemented in real-world preschool classrooms. Teachers have to manage large groups of children, follow strict schedules, and adapt to varying levels of student engagement, making one-on-one individuation sessions impractical. This raises important questions about whether individuation training can be adapted for group instruction. Additionally, most studies have not explored how long the effects of individuation training last after children return to their everyday routines. It remains unclear whether these interventions lead to lasting reductions in racial bias or if their effects fade over time (Qian et al.,

2017; Xiao et al., 2015). Broader concerns about sustaining intervention effects in social-cognitive development have been noted in related work (Botto & Kerr, 2024).

Colorblind Approaches in Schools

Another challenge in implementing individuation training is the widespread use of colorblind teaching methods in schools. Colorblind ideology is the belief that ignoring racial differences and treating all students the same will reduce bias, but research shows that this approach can reinforce racial inequalities (Bonilla-Silva, 2017).

Many teachers avoid talking about race because they worry that acknowledging racial differences might create bias rather than reduce it (Pahlke et al., 2012). However, studies show that when teachers avoid race-related discussions, children do not become less biased. For example, (Pahlke et al., 2012) found that many teachers intentionally avoided discussions about race, believing that talking about racial differences might encourage children to focus on it too much. Hughes et al. (2007) found that teachers who avoided race-related topics missed opportunities to challenge stereotypes and encourage more inclusive thinking. Similarly, White parents who took a colorblind approach to race socialization were less likely to address racial bias with their children, which allowed stereotypes to persist instead of being challenged (Vittrup & Holden, 2010). By preschool age, children already notice racial differences and show in-group preferences (Aboud, 2008), further invalidating the premise behind colorblind education.

Colorblind approaches discourage conversations about race, making it challenging to introduce individuation training in schools, but providing teacher training and institutional support may help educators understand how focusing on individual differences can reduce bias and promote inclusivity without reinforcing stereotypes.

Conclusion

The literature on racial bias in early childhood has evolved from early explicit measures, such as the Clark and Clark (1947) doll study, to more recent implicit assessments like the Implicit Racial Bias Test (IRBT). In the doll study, children were asked directly which doll they preferred, Black or White, making it an example of an explicit measure that relies on conscious responses. While these tools revealed important insights into how young children perceive race, they were often influenced by social desirability and lacked methodological controls. In contrast, implicit tools like the IRBT are designed to tap into unconscious associations by measuring reaction times, reducing the impact of children's desire to give socially acceptable answers. Modern research has shifted focus to implicit processes, providing stronger evidence that children as young as three begin to form unconscious racial associations. The Dissociation Model (Devine, 1989) and Social Cognitive Developmental Theory (Bigler & Liben, 2006) support the idea that implicit bias forms early and requires targeted intervention to reduce. Perceptual individuation training teaches children to focus on unique facial features or interests rather than racial categories and has shown promise in controlled experiments (Qian et al., 2017; Xiao et al., 2015).

Although individuation training has demonstrated effectiveness in reducing implicit racial bias, most findings to date have been limited to lab-based settings. There is a need to develop classroom-friendly interventions that can be realistically implemented in natural early childhood environments. The current study aims to evaluate whether a storybook-based individuation task can reduce implicit racial bias in preschool children. By integrating this task into a familiar and developmentally appropriate format, this study will test an individuation approach that could be used to promote bias reduction.

Methods

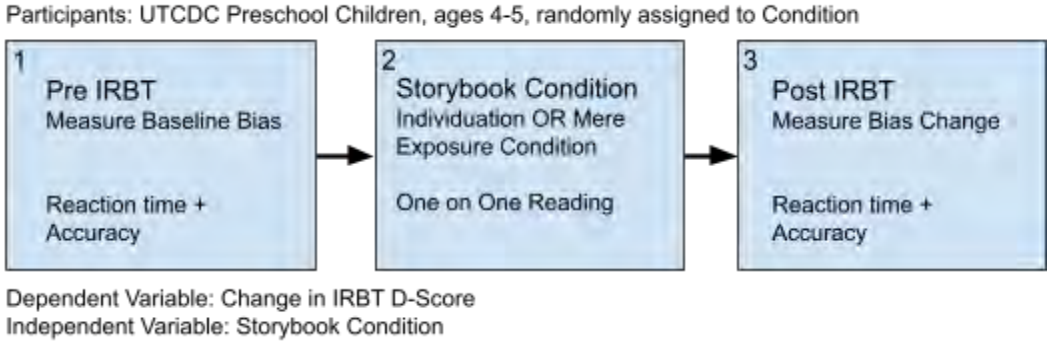
Design Overview

This study tested whether a storybook-based individuation training, which taught children to focus on individual interests rather than racial categories, reduced implicit racial bias in preschoolers. Prior research suggests that passive exposure to diversity alone has limited effects, so this study directly compared individuation and mere exposure conditions.

Children between 4 and 5 years old (N = 20) were randomly assigned to one of two storybook conditions: individuation, where out-group (Black) characters were labeled with names and unique interests, or mere exposure, where both out-group and own-race characters appeared without individuation. No black children participated in this study, but if any participants were black, their outgroup would be white children. All children completed the Implicit Racial Bias Test (IRBT) before and after the storybook reading to measure bias change (Figure 1). It was hypothesized that children in the individuation condition would show greater reductions in implicit bias than those in the mere exposure condition.

Figure 1

Overview of Experimental Design



Note. Children completed a pre-test IRBT to measure baseline bias, heard one of two storybook conditions (individuation or mere exposure), and then completed a post-test IRBT to measure bias change. Reaction time and accuracy were recorded at both testing sessions.

Participants

A total of N = 20 participants participated in the study. Children were recruited from two University of Texas Child Development Center (UTCDC) locations (Leona and Capitol Complex) and from the Children's Research Center (CRC) database through email recruitment. Families were contacted through UTCDC administrative staff or directly by the researcher (for CRC recruitment), and parents who expressed interest were emailed an informed consent form describing the study. All children were fluent in English, had parental consent to participate, and completed both study sessions.

Parents completed a brief demographic questionnaire reporting their child's age, gender, race/ethnicity, and familiarity with individuals from different racial groups. Children were then assigned to either the individuation or mere exposure storybook condition (see Design Overview).

An a priori power analysis conducted in G*Power ($f = 0.25$, $\alpha = .05$, power = .80, $r = .50$) estimated a target sample size of $N = 98$ for detecting medium-sized effects in a 2×2 mixed-design ANOVA. Due to real-world recruitment constraints at UTCDC sites and the CRC, the final sample size was smaller ($N = 20$), and results should therefore be interpreted with appropriate caution. Descriptive information about the sample is presented in Table 1.

Table 1

Participant Demographics and Descriptive Characteristics

Variable	N% or M (SD)
Total Participants	20
Age (Years)	4-5 years
Gender	60% Female 40% Male
Race/Ethnicity	White (65%); Mixed Black-White (10%); Latino (15%); South Asian (5%); East Asian (5%)
Diversity Exposure Score	M = 3.08, SD = 0.87

Note. Percentages based on a total sample of 20 children.

To match each child's racial background, four IRBT versions were created: White–Black, Latino–Black, Asian–Black, and Black–White. All faces shown during the task displayed a neutral expression. Each IRBT session consisted of four blocks: two congruent blocks followed by two incongruent blocks. In the first block, children completed a congruent practice block with four neutral faces (two in-group and two out-group). They were instructed to tap the smiling face for in-group faces and the frowning face for out-group faces. The second block was the congruent test block, which also included four faces with the same response mapping. After completing the congruent blocks, children completed two incongruent blocks that followed the same structure, except the response rules were reversed: children were instructed to tap the smiling face for out-group faces and the frowning face for in-group faces. Each IRBT session included 16 faces (4 trials with 4 faces each), and across the pre- and post-test sessions, children

saw 32 faces in total. Reaction time and accuracy were automatically recorded for each trial by the program.

Materials and Measures

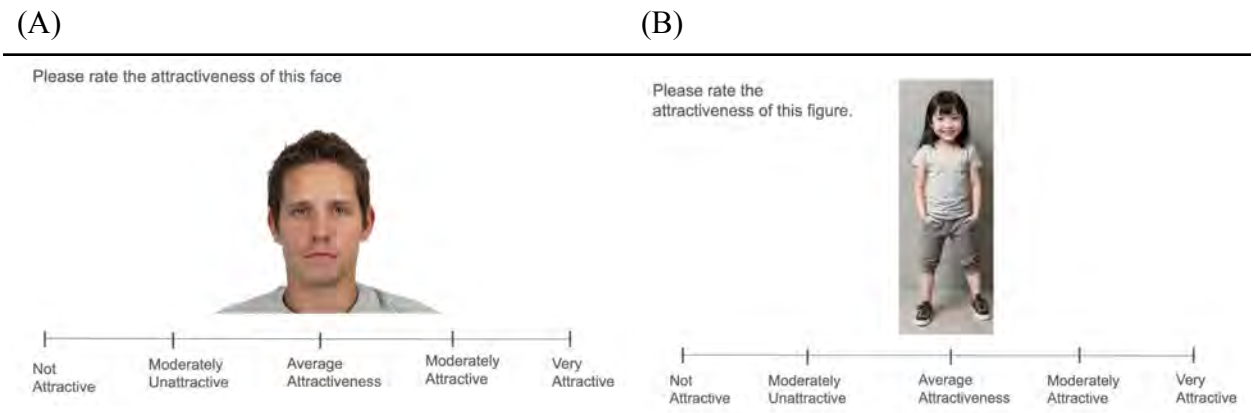
Facial Validation Pre-Study

The goal of the facial validation pre-study was to obtain baseline attractiveness ratings for all facial and figure stimuli that would later appear in the preschool IRBT. Before conducting the preschool study, the online face-validation task was completed by undergraduate participants recruited through the University of Texas SONA system. The SONA system is an online registration system used by researchers to post experiment opportunities for subject pool participants to register for experiments and obtain course credit. Students from an Introductory Psychology course (Psychology 301) (N = 45) completed the study online for course credit.

Participants rated 116 adult faces and 80 child figures (male and female; Asian, White, Black, and Latino) on a 5-point Likert scale ranging from 1 (*Not Attractive*) to 5 (*Very Attractive*). The survey displayed one image per screen with a rating scale beneath it (see Figure 2 for an example). The mean attractiveness score for each face and figure stimulus was used to construct face/figure stimuli sets that had similar mean attractiveness ranging across race and gender. The faces/figures that aligned closest to the mean for adult faces or mean for child figures were used in the IRBT and Storybook.

Figure 2

Example Stimulus Rating Trial From the Undergraduate Face-Validation Task



Note. Panel A shows an adult face rating trial, and Panel B shows a child figure rating trial. Undergraduate participants rated each stimulus on a 5-point Likert scale from 1 (Not attractive) to 5 (Very attractive).

Demographics and Diversity Exposure Score

Parents completed a short demographics form that asked about their child's age, gender, race/ethnicity, and English fluency. They also rated how often their child interacted with people of different racial or ethnic backgrounds in three contexts: within the family, in the neighborhood, and during extracurricular activities. Responses were made on a 5-point scale (1 = *Never*, 5 = *Very Frequently*). These responses were averaged to create a Diversity Exposure Score, which was later used in exploratory analyses to see whether exposure to racial diversity related to changes in bias.

Implicit Racial Bias Test (IRBT)

The IRBT is a preschool-friendly version of the Implicit Association Test (Qian et al., 2016). It was run on a touchscreen tablet and measured children's automatic associations

between race and emotional expression. Each child completed a pre-test and post-test version using identical faces across both sessions.

Children categorized faces by tapping on a “smiling” or “frowning” face button. The task included congruent trials (own-race faces with positive expressions; other-race faces with negative expressions) and incongruent trials (own-race faces with negative expressions; other-race faces with positive expressions). Reaction times were recorded for each trial, with responses under 300 ms or over 10,000 ms excluded. Only accurate trials were included, and participants with fewer than 75% valid responses were excluded from analysis.

For each participant, the mean reaction time was calculated separately for congruent and incongruent trials at both pre-test and post-test. These values were used to compute a D-score:

$$D = \frac{M_{\text{incongruent}} - M_{\text{congruent}}}{SD_{\text{all}}}$$

Positive D-scores indicate faster responses to congruent pairings, reflecting a bias favoring the in-group; negative scores indicate bias toward the out-group. To assess changes in bias following the storybook intervention, a change score (ΔD) was computed:

$$\Delta D = D_{\text{pre}} - D_{\text{post}}$$

Positive ΔD values indicate reductions in bias (movement toward zero), values near zero indicate little or no change, and negative ΔD values indicate increases in bias magnitude (movement away from zero in either direction).

Storybook Intervention

Two versions of a 21-page illustrated storybook were created, both featuring the same playground setting and eight child characters; four Black and four of the participant’s own race

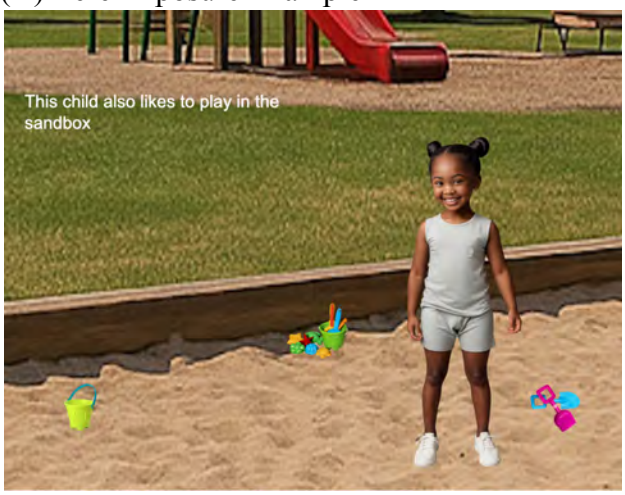
(two male, two female). The only difference between the versions was how the out-group characters were described. In the Individuation condition, Black characters were given names and unique interests (e.g., “This child likes to play basketball”), while in the Mere Exposure condition, all characters shared the same activity (“This child likes to play in the sandbox”).

Each storybook was read aloud individually to children in a quiet room. After the story, children were shown each of the eight characters again and asked, *“What did this child like to do on the playground?”* to check comprehension (See Figure 3 for an example of both storybook conditions).

Figure 3

Example Stimuli Used in the Mere Exposure and Individuation Storybook Conditions

(A)Mere Exposure Example 1



(B)Mere Exposure Example 2

(C)Individuation Example 1

(D)Individuation Example 2

Note. Panels A and B depict examples from the Mere Exposure condition, in which children saw peers engaging in similar activities without individualized traits. Panels C and D depict examples from the Individuation condition, in which children were provided with individualized information (e.g., unique preferences or behaviors). After each story, children were asked, "What did this child like to do on the playground?"

Procedures

All sessions were conducted individually in a quiet room, either at the University of Texas Child Development Centers, or in the Study room at the Language and Development Lab within the Children's Research Center. Each session lasted 10 minutes. Children first completed the pre-test IRBT on a touchscreen tablet. Each child was then read a short storybook that matched their assigned condition (individuation or mere exposure). The story was read aloud by the researcher, who encouraged the child to stay engaged by asking brief questions about the pictures and characters. Immediately following the storybook reading, children completed the post-test IRBT, which used the same stimuli as the pre-test.

Statistical Analyses

All analyses were conducted in R. Prior to computing D-scores, individual trials were screened for extreme values. Reaction times below 300 ms or above 10,000 ms were excluded, and only accurate trials were retained for analysis. For each child, mean reaction times for congruent and incongruent trials were computed separately for the pre-test and post-test sessions. These values were used to calculate a D-score for each session, and a change score ($\Delta D = D_{pre} - D_{post}$) was computed to quantify the amount of bias reduction, with positive values indicating movement toward zero (reduced bias).

Because the final sample size (N = 20) was substantially smaller than the a priori target, the data were not well-suited for a mixed-design ANOVA. Instead, group differences in bias change were examined using an independent-samples *t*-test comparing ΔD-scores between the individuation and mere exposure conditions. This analysis tested whether the amount of bias reduction differed by storybook condition. Within-group changes from pre- to post-test were also examined using descriptive statistics and visual inspection of D-score distributions.

Exploratory Pearson correlations were conducted to examine whether age, diversity exposure scores, or accuracy rates were related to bias change. Due to the small sample, these analyses were considered preliminary and interpreted cautiously.

Results

To provide an overview of implicit bias scores across conditions, descriptive statistics for pre-test, post-test, and bias-change (post–pre) D-scores were calculated for the Individuation and Mere Exposure groups. Table 2 presents the means and standard deviations for each time point and condition.

Table 2

Means and Standard Deviations for Pre-test, Post-test, and Change Scores by Condition

Condition	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Bias Change Mean	Bias Change SD
Individuation (I)	0.19	0.88	0.57	0.60	0.38	1.25
Mere Exposure (M)	-0.18	0.86	0.44	0.61	0.63	0.77

Children in both conditions showed increases in implicit bias from pre-test to post-test. Individuation participants increased from a mean D-score of 0.19 (SD = 0.88) to 0.57 (SD = 0.60), while Mere Exposure participants increased from –0.18 (SD = 0.86) to 0.44 (SD = 0.61). Mean change scores indicated a numerically larger increase in bias for the Mere Exposure group (M = 0.63, SD = 0.77) compared to the Individuation group (M = 0.38, SD = 1.25); however, this difference was not statistically significant. Notably, the Individuation group showed substantially greater variability in change scores, suggesting heterogeneous responses to the intervention.

Figure 4

Pre- and post-test D-scores for the Individuation and Mere Exposure conditions.

Note. Higher D-scores reflect greater implicit racial bias. Both groups showed increases from pre- to post-test, and the overall Time × Condition interaction was not significant.

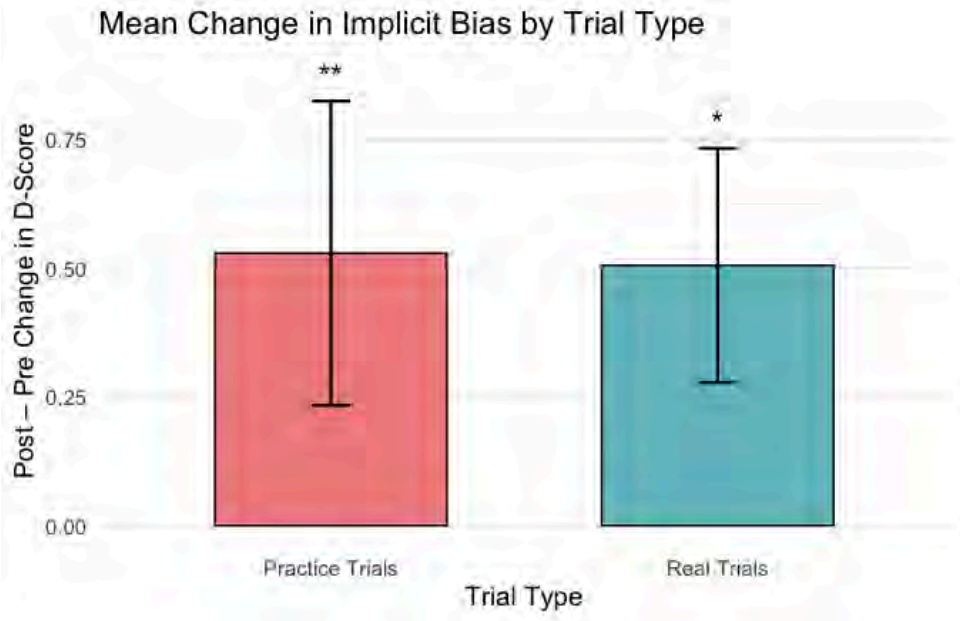
A 2 (Time: pre-test, post-test) × 2 (Condition: Individuation, Mere Exposure) mixed ANOVA was conducted on children's IRBT D-scores (see Figure 4). There was a *marginal* main effect of Time, such that implicit bias scores increased from pre-test to post-test, $p \approx .05$ (see Boxplot of D-Scores Across Conditions;). The main effect of Condition was not significant, indicating that children in the Individuation and Mere Exposure groups did not differ in overall bias. The Time × Condition interaction was also not significant, suggesting that individuation training did not reduce bias relative to mere exposure at the group level.

However, exploratory paired-sample tests within each condition showed different patterns: children in the Mere Exposure condition displayed a significant increase in bias from pre- to post-test, whereas the Individuation group did not exhibit a reliable change. This pattern

aligns with the descriptive boxplot, which shows greater upward shifts in D-scores for the Mere Exposure group.

Figure 5

Mean post–pre change in D-scores for practice and real trials

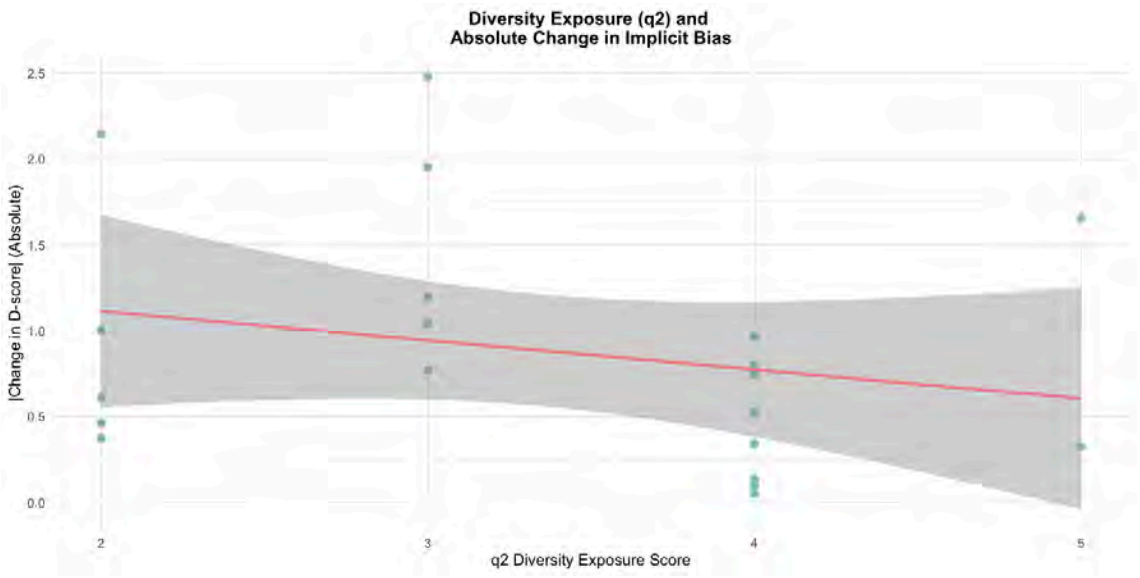


Note. Positive values indicate increased implicit bias from pre- to post-test. Both trial types showed significant increases, with practice trials showing a larger effect.

Because the IRBT includes both warm-up "practice" blocks and the primary "real" test blocks, changes in D-scores were examined separately for each trial type (see Figure 5). Practice trials showed a statistically significant increase in implicit bias, $p < .01$. Real trials also showed a smaller but significant increase, $p < .05$. These analyses confirm that the overall shift in bias was not an artifact of trial type but reflected a general trend across the assessment.

Figure 6

Scatterplot showing the association between community diversity exposure (q2) and absolute change in implicit bias (|post – pre|)



Note. Higher q2 scores were associated with smaller absolute changes in D-scores, indicating more stable responding among children with greater community diversity exposure.

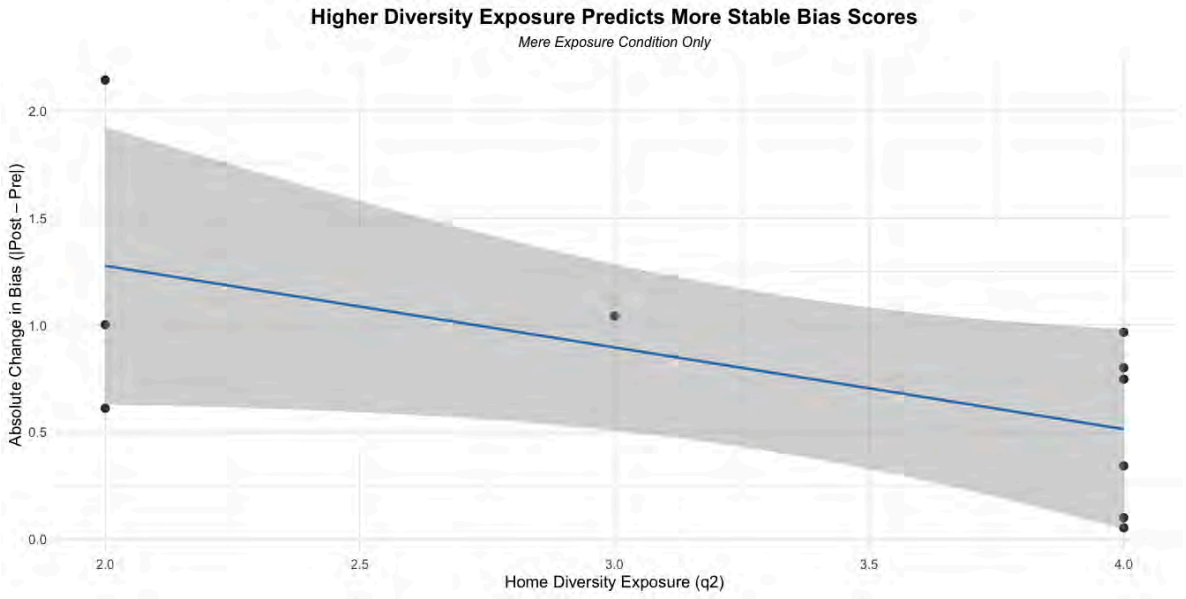
Parents reported children's diversity exposure across home, community, and extracurricular contexts. Community exposure (q2: "How often does your child interact with people of other races in the community?") was of particular interest because it showed the strongest relationship with changes in bias.

First, a simple linear model predicting raw change in bias (post–pre D-score) from q2 showed a *marginal* positive association, indicating that higher community exposure was associated with slightly larger increases in D-scores ($p \approx .06$, one-tailed). Because change direction can obscure patterns in small samples, a follow-up analysis examined absolute change (|post–pre|), which captures stability of responding regardless of direction.

A significant negative trend emerged: higher q2 community diversity exposure predicted smaller absolute changes in bias (β = –0.17), suggesting that children with more racially diverse community interactions showed more stable responses across the study (see Figure 6).

Figure 7

Scatterplot showing the relation between community diversity exposure (q2) and absolute change in implicit bias (|post – pre|) within the Mere Exposure condition.



Note. Higher q2 scores were associated with smaller absolute changes in D-scores, suggesting more stable bias responses among children with greater community exposure.

When this model was examined within conditions, the association was strongest in the Mere Exposure group (β = –0.38, p = .06), further suggesting that everyday diversity exposure may buffer against large fluctuations in implicit bias (see Figure 7).

Additional exploratory models tested whether child race (White vs. non-White), gender, or parent-reported diversity exposure were associated with IRBT accuracy or bias scores. No significant effects emerged. Race‑based comparisons of change in D-scores were not significant

(p = .58), and q2 did not predict changes in accuracy. These findings indicate that diversity exposure effects were specific to bias stability, not accuracy performance.

Discussion

The present study investigated whether a brief, storybook-based individuation intervention would reduce implicit racial bias in preschool-aged children more effectively than a mere exposure storybook, and whether children's real-world diversity exposure predicted the stability of their implicit bias responses. Contrary to predictions and prior laboratory findings, the individuation condition did not produce larger reductions in implicit bias than the mere exposure condition. Instead, implicit bias scores tended to increase modestly from pre-test to post-test across both groups. Although only marginally significant, this trend aligns with developmental research demonstrating that young children's implicit responses can be highly variable and sensitive to contextual or attentional factors rather than stable attitudes (Qian et al., 2016).

The absence of a Time × Condition interaction contrasts with studies showing that perceptual individuation training can reduce implicit racial bias in preschoolers under controlled conditions (Qian et al., 2017; Xiao et al., 2017). In laboratory settings, individuation tasks typically involve repeated, focused exposure to distinguishing features of other-race faces; training that directly supports the shift from category-based processing to individual-level processing (Hugenberg et al., 2007). Brief, classroom-based storybook readings may not provide sufficient repetition or cognitive scaffolding to reliably alter these perceptual habits. Additionally, young children's tendency to rely on salient social categories (Bigler & Liben, 2006; Bigler et al., 1997) may limit the impact of brief interventions unless reinforced across contexts.

The increase in D-scores from pre- to post-test may also reflect task-related fatigue or slowing rather than genuine increases in racial bias. Reaction-time measures in early childhood

are particularly susceptible to fluctuations in attention, motivation, and motor control (Dovidio et al., 2002). This interpretation is consistent with the finding that greater stability was observed in the practice trials, where children were first becoming familiar with the task structure.

The differences observed between practice and real trials highlight an important methodological consideration. Children showed *greater variability* and *larger changes* in D-scores during the practice blocks than during the real IRBT blocks, suggesting that some of the fluctuation in early trial performance may reflect task learning rather than genuine shifts in implicit attitudes. Developmental researchers have emphasized that young children's cognitive responses (particularly those involving reaction time) can be highly sensitive to novelty, attention shifts, and emerging executive functioning skills (Aboud, 2008). As a result, early practice trials may conflate perceptual or procedural learning with attitudinal responding, underscoring the need for adequate familiarization when adapting reaction-time measures for preschool populations.

Although the intervention itself did not differentiate outcomes between conditions, children's real-world contexts did. Higher community diversity exposure (q2) predicted smaller absolute changes in implicit bias scores from pre- to post-test. This indicates that children who regularly encounter diverse individuals show more consistent responding on implicit tasks. This pattern aligns with intergroup contact theory (Pettigrew & Tropp, 2006) and with developmental work showing that diverse peer and community interactions shape children's racial attitudes and reduce novelty-based reactivity to other-race faces (Gaias et al., 2018). Exposure may enhance familiarity with a wider range of faces, reducing the perceptual "other-race effect" that contributes to implicit bias variability (Sangrigoli et al., 2005; Lebrecht et al., 2009).

Importantly, diversity exposure did not predict *direction* of change (reductions vs. increases), but rather *stability*, suggesting that children's broader social environments may buffer against the noise inherent in implicit measures with preschoolers. This finding contributes to a growing literature emphasizing the importance of ecological and developmental contexts in shaping racial cognition (Aboud & Doyle, 1996; Umaña-Taylor & Hill, 2020).

These results highlight the challenge of modifying implicit racial attitudes in very young children through single-session interventions. According to social-cognitive developmental theories (Aboud, 1988; Bigler & Liben, 2006), early bias emerges from children's increasing attention to perceptually salient categories, combined with limited social experience. Interventions that interrupt these categorization defaults may require repeated, guided opportunities to individuate and meaningfully engage with diverse others. Storybook-based activities likely need to be embedded within broader classroom practices to produce durable effects, echoing calls for more race-conscious educational approaches (Botto & Kerr, 2024).

Additionally, the observed increase in post-test bias may reflect a reliance on automatic, category-based responses when children grow fatigued, consistent with dual-process accounts of prejudice (Devine, 1989; Greenwald & Banaji, 1995). This further underscores the need for designs that distinguish genuine attitude change from task-driven performance shifts.

Several limitations constrain interpretation of the findings. First, the sample size was relatively small, reducing statistical power and increasing susceptibility to measurement noise. Second, although the IRBT is adapted for young children, implicit measures in preschoolers lack reliability due to developmental variability in attention and cognitive control (Qian et al., 2016). Third, the intervention dosage was brief, especially compared to multi-session laboratory-based

individuation training. Finally, diversity exposure was measured via parent report and may not capture the qualitative nature of children's interactions.

Future work would benefit from implementing multi-session individuation training, embedding lessons across several weeks, or using more interactive, play-based individuation activities. Including multiple IRBT baseline assessments may help reduce measurement instability and separate true bias change from task learning effects. Additionally, investigating how teacher practices, peer diversity, and home racial socialization interact with intervention outcomes could deepen understanding of how racial attitudes develop across contexts (Pahlke et al., 2012; Vittrup & Holden, 2010).

Although individuation training did not outperform mere exposure in reducing implicit racial bias, this study offers several meaningful contributions. It illustrates the challenges of eliciting measurable shifts in young children's implicit attitudes in naturalistic settings, highlights the methodological sensitivity of reaction-time bias measures, and provides preliminary evidence that children's everyday diversity exposure predicts the stability of their implicit responses. These findings support the broader developmental view that interventions must be contextual, repeated, and aligned with children's lived experiences to promote meaningful reductions in racial bias.

References

Aboud, F. E. (1988). *Children and prejudice*. Blackwell.

Aboud, F. E. (2008). A social-cognitive developmental theory of prejudice. In S. M. Quintana & C. McKown (Eds.), *Handbook of race, racism, and the developing child* (pp. 55–71). Wiley.

Aboud, F. E., & Doyle, A. B. (1996). Parental and peer influences on children's racial attitudes. *International Journal of Intercultural Relations, 20*(3-4), 371–383.

Bigler, R. S., Brown, C. S., & Markell, M. (2001). When groups are not created equal: Effects of group status on the formation of intergroup attitudes in children. *Child Development, 72*(4), 1151–1162. https://doi.org/10.1111/1467-8624.00339

Bigler, R. S., & Liben, L. S. (2006). A developmental intergroup theory of social stereotypes and prejudice. In R. V. Kail (Ed.), *Advances in child development and behavior* (Vol. 34, pp. 38–89). Elsevier.

Bigler, R. S., Jones, L. C., & Lobliner, D. B. (1997). Social categorization and the formation of intergroup attitudes in children. *Child Development, 68*(3), 530–543.

Bonilla-Silva, E. (2017). *Racism without racists: Color-blind racism and the persistence of racial inequality in the United States* (5th ed.). Rowman & Littlefield.

Botto, S. V., & Kerr, J. (2024). Race-conscious education and bias reduction: Examining the effectiveness of structured classroom interventions. *Journal of Applied Developmental Psychology, 78*, 101392.

Carbado, D. W., & Harris, C. I. (2008). The new racial preferences. *California Law Review, 96*(5), 1139–1214.

Clark, K. B., & Clark, M. P. (1947). Racial identification and preference in Negro children. In T. M. Newcomb & E. L. Hartley (Eds.), *Readings in social psychology* (pp. 169–178). Holt, Rinehart & Winston.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology, 56*(1), 5–18.

Dovidio, J. F., Kawakami, K., & Gaertner, S. L. (2002). Implicit and explicit prejudice and interracial interaction. *Journal of Personality and Social Psychology, 82*(1), 62–68.

Gaias, L. M., Gal, D. E., Abry, T., Taylor, M., & Granger, K. L. (2018). Diversity exposure in preschool: Longitudinal implications for cross-race friendships and racial bias. *Developmental Psychology, 54*(11), 2151–2166.

Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102*(1), 4–27.

Hugenberg, K., Miller, J., & Claypool, H. M. (2007). Categorization and individuation in the cross-race recognition deficit: Toward a solution to an insidious problem. *Journal of Experimental Social Psychology, 43*(2), 334–340.

Hughes, J. M., Bigler, R. S., & Levy, S. (2007). Consequences of learning about racism among European American and African American children. *Child Development, 78*(6), 1689–1705.

Jordan, P. L., & Hernandez-Reif, M. (2009). Re-examining the Clark Doll Test: Skin tone preferences in young African-American children. *Journal of Black Psychology, 35*(3), 392–412.

Katz, P. A., & Zalk, S. R. (1974). Infant color perception and preferences. *Journal of Psychology, 87*(1), 15–21.

Lebrecht, S., Pierce, L. J., Tarr, M. J., & Tanaka, J. W. (2009). Perceptual other-race training reduces implicit racial bias. *PLoS ONE, 4*(1), e4215. https://doi.org/10.1371/journal.pone.0004215

Pahlke, E., Bigler, R. S., & Suizzo, M. A. (2012). Relations between colorblind socialization and children's racial bias: Evidence from European American mothers and their preschool children. *Child Development, 83*(4), 1164–1179.

Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology, 90*(5), 751–783.

Pollock, M. (2005). *Colormute: Race talk dilemmas in an American school*. Princeton University Press.

Qian, M. K., Heyman, G. D., Quinn, P. C., Fu, G., Lee, K., & Pascalis, O. (2016). Implicit racial biases in preschool children and adults from Asia and Africa. *Child Development, 87*(6), 285–296.

Qian, M. K., Quinn, P. C., Heyman, G. D., Fu, G., Lee, K., & Pascalis, O. (2017). Perceptual individuation training (but not mere exposure) reduces implicit racial bias in preschool children. *Developmental Psychology, 53*(8), 1424–1433.

Sangrigoli, S., Pallier, C., Argenti, A. M., Ventureyra, V. A., & de Schonen, S. (2005). Reversibility of the other-race effect in face recognition during childhood. *Psychological Science, 16*(6), 440–444.

Umaña-Taylor, A. J., & Hill, N. E. (2020). Ethnic-racial socialization and academic achievement: A meta-analytic review. *Developmental Psychology, 56*(4), 533–548.

Vittrup, B., & Holden, G. W. (2010). Exploring the impact of educational television and parent-child discussions on children's racial attitudes. *Analyses of Social Issues and Public Policy, 10*(1), 192–214.

Xiao, N. G., Quinn, P. C., Pascalis, O., Lee, K., & Tanaka, J. W. (2015). Own- and other-race face recognition in children: The role of perceptual individuation training. *Developmental Science, 18*(4), 655–667.

Xiao, N. G., Quinn, P. C., Pascalis, O., Lee, K., & Tanaka, J. W. (2017). Individuation training reduces implicit racial bias in preschool children: Evidence from a cross-cultural study. *Developmental Science, 20*(5), e12453.

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology, 9*(2, Pt.2), 1–27. https://doi.org/10.1037/h0025848