

Early Developmental Insights Into the Social Construction of Race

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The way that societies assign people to racial categories has far-reaching social, economic, and political consequences. One framework for establishing racial boundaries is based on *ancestry*, which historically has been leveraged to create rigid racial categories, particularly with respect to being categorized as White. A second framework is based on *skin tone*, which can vary within families and across the lifespan, and is thus more likely to blur racial boundaries. The persistence of these distinct cultural beliefs about race requires that they be transmitted to each new generation, but there have been few cross-cultural studies on their development during childhood. Participants (5- to 12-year-old children, $N = 123$) were from the United States, in which the ancestry model has been more prevalent, or from Brazil, in which the skin tone model has been more prevalent. In both countries, 5- to 7-year-olds endorsed the belief that skin tone determines race, for example, by assigning biological siblings with differing skin tones to different racial categories. However, racial concepts diverged among the 10- to 12-year-olds, with children from the United States shifting toward a classification based on ancestry and children in Brazil endorsing a classification based on skin tone even more strongly with age. These differing conceptions were especially evident with reference to White racial categorization: Older children from Brazil persisted in classifying lighter skinned people as White when they had African ancestry, unlike older children from the United States. These findings provide important insights into the developmental and cultural influences on racial classification systems.

Public Significance Statement

Psychological research on racial categorization has focused almost exclusively on U.S.-centric views of race. This research indicates that adults in the United States tend to classify people in ways that reflect essentialist, ancestry-based views, such as classifying a child of Black parents as Black, regardless of skin tone. However, sociological investigations of cultures beyond the United States indicate that such views of race are not universal; indeed, less essentialist, skin tone views of race are prevalent in Brazil. The present study examines the developmental origins of these diverging racial classification systems. The present research offers an international perspective that informs our understanding of beliefs about race. This work contributes to broader and more nuanced conversations about racial categorization and its implications, both in psychological research and in society at large.

Keywords: race, categorization, development, culture

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A society's racial classification system has far-reaching social, economic, and political consequences (Davenport, 2020; Roberts & Rizzo, 2021; Roth et al., 2023). In the psychological literature, societal racial concepts have been studied almost exclusively in the United States. For example, traditional measures of race concepts were developed with U.S. samples and based on U.S. ideologies (e.g., Race Concepts Scale, Beliefs About Race Scale; Tawa, 2017; Williams & Eberhardt, 2008), and theories of racial categorization

have focused on U.S.-specific issues such as *hypodescent* and the "one-drop rule" (Albuja et al., 2024; Halberstadt et al., 2011; Ho et al., 2017; Noyes & Keil, 2018; Roberts & Rizzo, 2021; Young et al., 2021; but see Chen et al., 2018; Sacco et al., 2019, for important exceptions). Yet, sociological research indicates that cultures vary substantially in how racial boundaries are drawn (Joseph, 2015; Roth et al., 2023; E. E. Telles, 2014), offering insight into how and why societies adopt different constructions of race. The present

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continued

research takes a cross-cultural and developmental approach to examine children's developing understanding of their society's racial classification system. We focus on the contrast between the United States, which adopted a concept of race based on *ancestry* (which was historically leveraged to create rigid, essentialist racial categories), versus Brazil, which adopted a racial framework based on *skin tone* (which can vary within families and across the lifespan and has led to a blurring of racial boundaries, see Chen et al., 2018; Sacco et al., 2019).

The racial concepts that people have today in the United States and Brazil have deep historical roots (Davenport, 2020). Many critical aspects of these roots are shared: Both countries have a history of European colonization, enslavement of African people, and pseudoscientific beliefs in white¹ supremacy (Davenport, 2020; dos Santos, 2002; E. E. Telles, 2014). Further, following the abolishment of slavery at the end of the 19th century, political elites in both countries sought to maintain status as a white nation (Davis, 1991; dos Santos, 2002).

It is also the case that views of race evolved in distinct ways across the two cultures. The United States has long emphasized the role that ancestry plays in racial classification (Chen et al., 2018). Although an ancestry-based approach need not be rigid in principle (e.g., boundaries could be drawn and redrawn based on many different thresholds and aspects of ancestry), the United States leveraged this approach to maintain a clear boundary between enslaved and free people. In particular, the United States sought to create an exclusive, rigid White racial category that included people of solely European heritage and excluded people with any African heritage (i.e., the one-drop rule; Davis, 1991). Several U.S. states rejected a "Multiracial" category to establish group boundaries; people with "one drop" of African ancestry were considered Black (see Roberts & Gelman, 2015).

In contrast, there was motivation within Brazil to make the White racial category expansive, as Brazil had a much larger African population that was likely to preclude them from being recognized by other countries as a white nation (Nobles, 2000). Whereas the United States enslaved approximately 250,000 African people, Brazil enslaved over 5 million (Statista, 2024). Large-scale efforts by the Brazilian government were made to "whiten" the population by incentivizing European immigration, based in part on the idea that "white genes" were purported to be stronger than "black genes" (E. Telles & Paschel, 2014). Notably, this eugenic idea was opposite of the United States' eugenic ideas, which conceptualized "white blood" as pure (Davis, 1991; Noyes & Keil, 2018).

The Brazilian government also attempted to socially and politically weaken the African Brazilian population by explicitly encouraging interracial marriage. Moreover, the predominant belief (though not institutionally formalized) has been that race is mainly defined by phenotype (Sacco et al., 2019), with Brazilians self-categorizing as either White, Pardo/a (i.e., an intermediate category between White and Black), or Black (the 2022 Brazilian census indicates that 99% of the population identifies with one of these racial categories,

specifically 45% identified as Pardo, 44% as White, 10% as Black; Brazilian Institute of Geography and Statistics, 2022). Under this phenotype view, a person could be considered White in Brazil if they had lighter skin, regardless of African heritage (S. R. Bailey et al., 2013). Despite its roots in slavery and anti-Blackness, much of the discourse around race has been that Brazilian society is nondiscriminatory (Skidmore, 2019). By the 1950s, race relations in Brazil had an international reputation for being harmonious. Brazil was even studied as a positive model that other countries could follow, although Afro-Brazilian activists started strongly challenging this view in the late 1970s (S. R. Bailey et al., 2013).

Historical differences in racial concepts between the United States and Brazil remain consequential today (S. R. Bailey et al., 2013; Joseph, 2015; Roberts & Rizzo, 2021). For example, patterns of racial inequality in Brazil more closely track skin color than ancestry (S. R. Bailey et al., 2013), and affirmative action policies, in turn, often seek to redress racial inequality based on phenotype (e.g., considering people's skin color in college admissions and creating boards to determine someone's race by examining their appearance; De Oliveira, 2017; Garcia-Navarro, 2016). In contrast, U.S. affirmative action policies have been based on ancestral origin rather than physical appearance (Arcidiacono et al., 2015).

To understand the persistence of societal racial concepts across generations, it is critical to understand how *children* adopt racial classification systems. Prior research has examined children's attitudes toward different racial groups (Qian et al., 2021; Reyes-Jaquez et al., 2021; Yu et al., 2022), including in the United States and Brazil (Rizzo et al., 2022; Sacco et al., 2019). Previous studies have also clarified several aspects of children's race concepts (Albuja et al., 2024; Lei & Rhodes, 2021; Pauker, Williams, & Steele, 2016), including their beliefs about the heritability and stability of skin tone, whether they use skin tone versus other characteristics to categorize others, and whether race is viewed as a natural versus subjective social category (Dunham et al., 2015; Pauker et al., 2010; Rhodes & Gelman, 2009; Rhodes & Mandalaywala, 2017; Roberts & Gelman, 2016; Stepanova et al., 2021).

Little is known, however, about children's adoption of their society's *racial classification system* and how this trajectory unfolds across different cultural contexts. We consider several lines of research to inform our hypotheses regarding this developmental trajectory. One possibility is that cross-cultural divergence in racial classification emerges early. This hypothesis is in line with evidence of early-emerging cross-cultural differences in infants' visual processing of people from different racial backgrounds

¹ This article follows recommendations presented in the APA Style Executive summary - Journal Article Reporting Standards for Race, Ethnicity, and Culture (<https://apastyle.apa.org/jars/race-ethnicity-culture-executive-summary>). In particular, we capitalize proper nouns when referring to racial and ethnic groups and identities. However, when discussing racist beliefs stemming from white supremacy, we use lowercase.

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(Anzures et al., 2013). However, given that there tends to be protracted development in race *concepts* between 5 and 10 years of age (Lei et al., 2022; Rhodes & Gelman, 2009; Roberts & Gelman, 2015), a more likely hypothesis is that children's understanding of their society's racial classification systems unfolds *slowly* across childhood. For example, in one study, Rhodes and Gelman (2009) found that it was not until around 10 years of age that U.S. children's concept of race as an objective versus subjective category aligned with the beliefs that are typical within their community. Relatedly, a study on the categorization of Mixed-race individuals showed that it is also not until age 10 that U.S. children reliably link race to ancestry information like U.S. adults (Roberts & Gelman, 2015), suggesting that race concepts are culturally learned with age. Taken together, we expected that cross-cultural differences in racial classification may emerge in later childhood.

Implicit in this hypothesis is that younger children, across cultures, may *share* intuitions about racial classification. We posit that skin tone may be more salient than ancestry in influencing young children's racial categorization. Indeed, when categorizing individuals along the White–Black continuum, children tend to weigh skin tone more strongly than factors such as facial structure (Dunham et al., 2015; Stepanova et al., 2021). U.S. children younger than 7 years old are also *less* sensitive than older children to the presence of ancestry information (Roberts & Gelman, 2015). In sum, we hypothesized that (a) there would be cross-cultural differences in race concepts by later childhood (i.e., by 10 years old), and (b) young children across cultures would privilege skin tone over ancestry information.

The Present Research

The current research is the first cross-cultural, developmental investigation of racial classification in countries with distinct ideologies, the United States and Brazil. Our sample included two age groups: 5- to 7-year-olds and 10- to 12-year-olds. We expected to see evidence of a developmental change in which the younger group in both the United States and Brazil would privilege skin tone over ancestry and in which the older group would show cross-cultural divergence (i.e., U.S. children would shift toward an ancestry view of race and Brazilian children would still privilege skin tone).

To test these hypotheses, we designed a novel paradigm that teased apart the extent to which race is conceptualized as *skin color* (as is more prevalent in Brazil) versus ancestry (as is more prevalent the United States). We inferred children's racial classification as being based on skin color over ancestry if, when making racial categorizations, they privileged skin color over ancestry-related information (i.e., parental heritage, biological relatedness, and initial features). Given that the historical purpose of each ideology was to create an exclusive versus an expansive White racial category (in the United States and Brazil, respectively), the tasks were also designed to investigate the rigidity of children's White racial categorization in particular. Specifically, we examined children's tendency to racially categorize targets as White when they had a lighter skin tone but had African ancestry. Across tasks, we examined age by culture interactions to test whether cultural differences in racial categorization emerged in later childhood (10–12 years) rather than early childhood (5–7 years).

Method

Participants

Participants were 123 children aged 5–7 years ($n = 25$ from the United States and $n = 29$ from Brazil) and 10–12 years ($n = 27$ from the United States and $n = 42$ from Brazil). The sample size was determined based on a small pilot study with Brazilian and U.S. adults using a preliminary version of the tasks ($N = 20$). The pilot study indicated a large effect size of culture on the race composite score (Cohen's $d = 1.03$), and a power analysis ($\alpha = .05$; power = .80) indicated that we would be able to find that cross-cultural difference with 16 per age group. We collected as much child data in Brazil as possible during a 1-month visit there, with the target of at least 25 per age group to account for greater noise among children. We then collected data from at least 25 U.S. children per age group. Brazilian children were recruited from schools, daycare centers, and public parks in São Paulo, the most populous and multicultural city in Brazil and the fourth largest city in the world. U.S. children were recruited from the Children Helping Science platform (22 U.S. states in total; Scott & Schulz, 2017; Sheskin et al., 2020).

For both samples, parents reported their children's gender and race, described as "ethnicity/race" in both contexts. In the United States, parents selected as many categories that applied to them: Asian, Black, Latinx/Hispanic, Native American, Native Hawaiian and other Pacific Islander, White (not of Hispanic origin), and Middle Eastern. These categories were used because they are common in U.S. demographic forms and align with lay understanding of racial categories. In Brazil, the question was open-ended, and parents in our sample categorized their children as either Black (Preto/a or Negro/a), Multiracial (Pardo/a or Moreno/a), or White (Branco/a). Based on parent reports, the sample was about half female (50% female in the United States; 52% female in Brazil) and half male (50% male in the United States and 48% male in Brazil) and was racially diverse (United States: 48% White; 23% Multiracial, including Black/White, Black/Asian, and Asian/White; 17% Asian; 8% Latine/x; 2% Middle Eastern; 2% Jewish; Brazil: 42% Multiracial, 41% White, 16% Black, 1% did not report). The study was conducted between 2022 and 2023. This research was approved by the University of California, San Diego Institutional Review Board.

Procedure

Children were interviewed one-on-one with an experimenter; experimenters were female college students across both cultural contexts. U.S. interviews were conducted over Zoom with native U.S. experimenters in English, while Brazil interviews were conducted in person with a native Brazilian female experimenter in Portuguese. Participants were informed that they were going to learn about different children and asked about their race/ethnicity, specifically whether they thought the children were White, Multiracial/Mixed Race, or Black. We told participants that these questions help us learn how people around the world think about social groups. To further emphasize group categorization, participants first completed a practice trial in which we presented a fruit and asked children to label what kind of fruit it was.

Children completed three racial categorization tasks that each assessed whether children conceptualized race as being determined by ancestry versus skin tone. All tasks had an attention check to ensure that children understood the ancestry-related information

(e.g., children were asked to point to the biological parents of each target in the parental heritage task). Children were randomly assigned to classify all girl targets or all boy targets. The task order was counterbalanced, such that children either completed the parental heritage task first and skin tone change task last or the reverse order. Children completed additional exploratory tasks that were beyond the scope of the main research question regarding children's racial categorization by ancestry versus skin tone and thus are reported in the [Supplemental Material](#).

Measures

Parental Heritage Task

Participants were presented with images of two children with their biological parents: "Look at this [girl/boy]! [S/he] is with [his/her] biological parents. That means [s/he] came from the tummy of this mommy, and this is [her/his] daddy. Can you remind me, who are this [girl's/boy's] parents?" Experimenters then reiterated the parents of each target. One child had a medium skin tone but had two parents who are phenotypically White (in both the United States and Brazil), while the second child had a light skin tone but had two parents who are phenotypically Black (in both the United States and Brazil). The key test question used across all tasks was, "Is this [girl/boy]: White, Multiracial/Mixed Race, or Black?" If children were privileging ancestry, they should categorize the first target as White and the second target as Black (or potentially Mixed, which technically could be accurate within the U.S. framework of race since we did not specify that all of their grandparents were Black and not White). However, if children were privileging skin tone, racial categorizations should flip such that they should categorize the targets in line with their different skin tones, such as categorizing the first target as Mixed and the second as White.

Biological Sibling Task

Children were presented with images of two biological siblings who differed in skin tone due to one sibling having a skin condition:

Look at these [sisters/brothers]! They have the same mommy and daddy. This [sister/brother] was born with this skin tone. This [sister/brother] has a skin condition that makes [her/him] have lighter skin. Can you remind me, which [sister/brother] has the skin condition?

Experimenters reiterated that the sibling with lighter skin had the condition. We gave the explanation of the lighter skinned sibling as having a skin condition to reduce the chances that participants would reason the targets may actually have different parents. Both siblings had Afrocentric features (e.g., dark coily hair) and thus should be categorized as both Mixed or both Black if children were relying on ancestry, but they are categorized as different races in line with their skin tone variation if children privileged skin tone (e.g., one Mixed and the other White).

Skin Tone Change Task

Children were shown pictures of a child who first had darker skin but then later experienced a change in skin tone to a lighter color:

Look at this girl! [children provided initial categorization] When this girl was a little older, her skin tone changed color. Now here is a picture

of her one year later! Can you remind me, is this picture of her when she is younger or older?

Experimenters reiterated that the second picture was when the child was older. Children who privileged ancestry should keep their racial categorization the same as their initial choice despite the superficial change in skin tone (e.g., both time points as Black), while children who privileged skin tone should change their categorization in response to the skin tone change (e.g., from Black to White).

Race as Skin Tone Composite Score. We calculated a race concept composite score that indicated the extent to which children endorsed the view that racial classification is determined by skin tone. To do so, we coded whether in each task children classified the targets differently in ways that aligned with skin tone differences.

For the parental heritage task, children were given a "1" if they categorized the child with White parents (who we will refer to as "Child A") in a racial category with a typically darker skin tone than the child with Black parents (who we will refer to as "Child B"). All possible combinations to receive a "1" on the task were as follows: (a) Child A: "Black" and Child B: "White" (7%), (b) Child A: "Mixed" and Child B: "White" (59%), and (c) Child A: "Black" and Child B: "Mixed" (2%). Any other combination received a score of "0" (33%).

For the sibling task, children were given a "1" if they categorized the darker skinned sibling (who we will refer to as "Sibling A") in a racial category with a typically darker skin tone than the lighter skinned sibling (who we will refer to as "Sibling B"). All possible combinations to receive a "1" on the task were as follows: (a) Sibling A: "Black" and Sibling B: "White" (31%), (b) Sibling A: "Mixed" and Sibling B: "White" (32%), and (c) Sibling A: "Black" and Sibling B: "Mixed" (14%). Any other combination received a score of "0" (23%).

For the skin tone change task, children were given a "1" if they categorized the child at baseline when they had darker skin (which we will refer to as "Time Point 1"), in a racial category with a typically darker skin tone than when they had lighter skin (which we will refer to as "Time Point 2"). All possible combinations to receive a "1" on the task were as follows: (a) Time Point 1: "Black" and Time Point 2: "White" (45%), (b) Time Point 1: "Mixed" and Time Point 2: "White" (18%), and (c) Time Point 1: "Black" and Time Point 2: "Mixed" (15%). Any other combination received a score of "0" (22%).

We summed these three scores together. Thus, possible scores for the composite ranged from 0 to 3, with higher scores indicating stronger endorsement that race = skin tone. Cronbach's α coefficients indicated that the three task items held together fairly well among children (Cronbach's α = .64) and more strongly in a validation sample of adults (Cronbach's α = .76; see the Stimuli Validation With Adults section). This aligns with prior work indicating that dimensions of essentialist reasoning become more coherent with age (Gelman et al., 2007).

Stimuli Validation With Adults

To validate that the tasks captured the historical cross-cultural differences, we conducted one-on-one Zoom interviews with 20 U.S. adults and 20 Brazilian adults (U.S. gender composition: 55% women, 45% men; Brazil gender composition: 70% women, 30% men). The adult sample was diverse with respect to race (U.S. racial composition: 45% White, 40% Black, 10% Multiracial, 5% Asian;

Brazil racial composition: 55% White, 25% Black, 20% Multiracial). Adults were sampled from the community and from U.S. and Brazilian universities.

Adult Validation Study Results

We coded adults' responses as we did children to create the race = skin tone composite score. Here, we briefly report results from each individual task and for the overall composite score.

Individual Tasks. With respect to the *parental heritage task*, 0% of U.S. adults privileged skin tone over parental heritage information, while 15% of Brazilian adults did. For the *sibling task*, 0% of U.S. adults categorized the siblings differently in accordance with their skin tone, while 30% of Brazilian adults did. For the *skin tone change task*, 0% of U.S. adults changed their racial categorizations when the target's skin tone lightened, while 55% of Brazilian adults did.

Race = Skin Tone Composite Score. When summing together all three tasks (i.e., for each task, 1 = privileged skin tone, 0 = not; composite score range = 0–3), we found that U.S. participants were *less* likely than Brazilian participants to endorse a race = skin tone versus ancestry concept of racial classification, $B = -1.00$, $p < .001$, 95% CI [-1.49, -0.51], $\beta = -.56$. All 20 U.S. adults scored a 0 on the race = skin tone composite score, while the average score for Brazilian adults was 1 out of 3. Qualitatively, we also found support for our measures. U.S. participants tended to reference the ancestry information when justifying their categorizations, while some Brazilian participants explicitly mentioned ignoring this information.

Summary. Overall, this validation study indicated that the measures picked up on the expected cross-cultural differences: Brazilian adults, more than U.S. adults, privileged skin tone over ancestry in their racial categorizations. Yet, it is also notable that these cultural differences were smaller than expected. This may be due to several factors, including pragmatic factors such as the experimenter emphasizing ancestry information in each task's attention question. However, these results may also capture true change in some Brazilian adults' race concepts, which may be influenced by societal movements that recognize and celebrate African heritage (e.g., *Movimento Negro Unificado* led by Afro-Brazilian civil rights activists and, more recently, the 2020 global *Black Lives Matter* movement; Davenport, 2020; see also De Micheli, 2021).

Transparency and Openness Statement

The study materials, data, and analysis scripts are available on the Open Science Framework at <https://osf.io/vxg48/>. The analyses and results were double-checked and successfully reproduced. We used R Version 4.3.1 (R Core Team, 2023) and the following R packages: lsr V. 0.5.1 (Navarro, 2015), rmarkdown V. 2.24 (Allaire et al., 2023; Xie et al., 2018, 2020), and tidyverse V. 2.0.0 (Wickham et al., 2019). The study was not preregistered and should be treated as exploratory.

Results

We now turn to the central results with the developmental sample. Figures 1–3 present children's racial categorizations in each task.

Figure 4 presents the racial concept composite scores. All figures present data by age group (5–7 years vs. 10–12 years) and culture (United States vs. Brazil).

Our analyses tested for cultural differences in racial classification across development, specifically whether these differences emerge in later childhood (i.e., ages 10–12). We did this using three analytic approaches. First, we tested for cultural differences among the younger (5–7 years) and older (10–12 years) age groups for *each individual task item*. Given that each item was a categorical variable with multiple levels (i.e., White, Mixed, or Black classification), we used chi-square tests to determine if the distribution of responses varied by culture for each group. Second, for a more holistic approach, we tested for an Age \times Group Culture interaction predicting the race as skin tone composite score. This analysis used a Poisson regression model given the count data (Coxe et al., 2009). Third, to examine the rigidity of children's White racial categorization of targets who had lighter skin and African ancestry, we used logistic regressions to predict White (vs. not) racial categorization, again testing for Age Group \times Culture interactions.

Parental Heritage Task

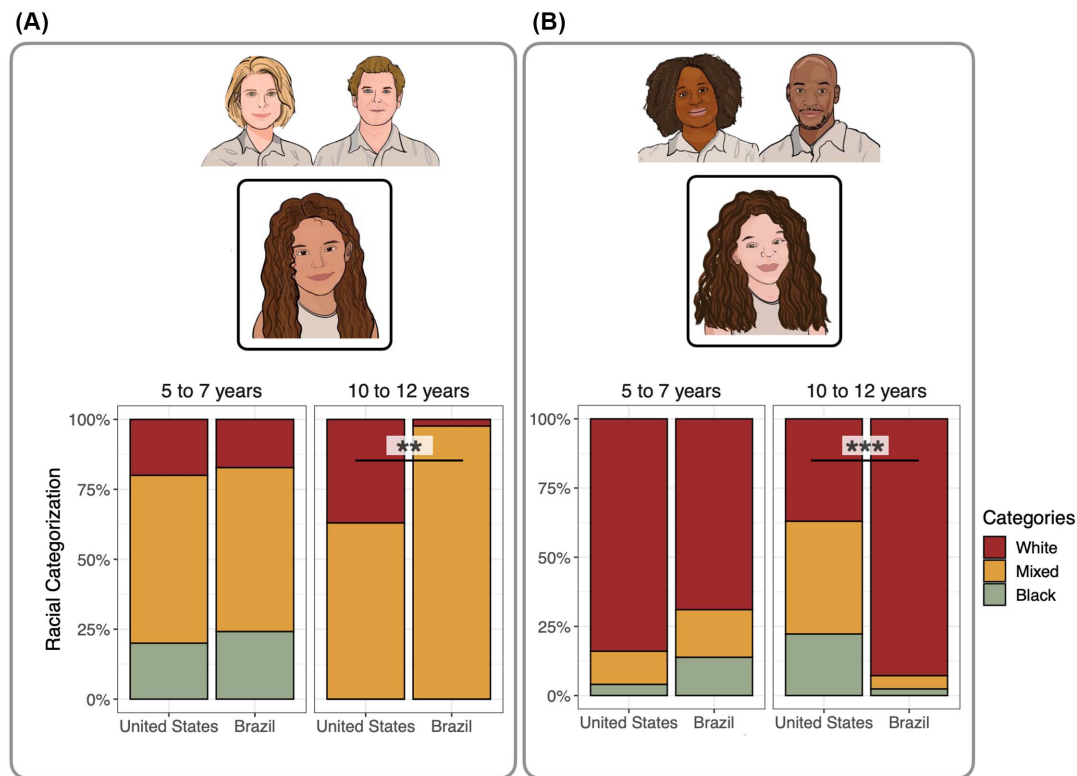
As shown in Figure 1, there were no cultural differences in younger children's categorization of the child with two parents of European heritage, $\chi^2(2) = 0.16$, $p = .92$, Cramer's $V = 0.05$ (Figure 1A), or the child with two parents of African heritage, $\chi^2(2) = 2.04$, $p = .36$, Cramer's $V = 0.19$ (Figure 1B). In both countries, younger children privileged skin tone over parental heritage information: Younger children tended to categorize the child of European descent who had a medium skin tone as Mixed (59%) and the child of African descent who had a light skin tone as White (76%).

In contrast, there were significant cultural differences among older children when categorizing the child of European descent, $\chi^2(1) = 12.26$, $p < .001$, Cramer's $V = 0.42$ (Figure 1A), and the child of African descent, $\chi^2(2) = 24.88$, $p < .001$, Cramer's $V = 0.60$ (Figure 1B). Older U.S. children categorized the child with White parents as Mixed (63%), but there was also a substantial percentage who, in line with ancestry-based rules, categorized the child as White (37%). In contrast, almost all older Brazilian children (98%) categorized this child as Mixed. Similarly, while older U.S. children showed evidence of considering heritage when categorizing the child of African heritage (22% Black, 41% Mixed), almost all older Brazilian children privileged skin tone and categorized the child as White (93%).

Biological Sibling Task

When there was no conflict between ancestry and skin tone (Figure 2, Sibling A with darker skin), there were no cultural differences in racial categorization among younger children, $\chi^2(2) = 1.13$, $p = .57$, Cramer's $V = 0.14$, or older children, $\chi^2(1) = 0.01$, $p = .94$, Cramer's $V = 0.01$. Across participants, this sibling was categorized as either Black (55%) or Mixed (42%). When these factors came into conflict for the sibling with a lighter skin tone due to a skin condition (Figure 2, Sibling B with lighter skin), there were again no cultural differences in categorizations among younger children, $\chi^2(2) = 0.43$, $p = .81$, Cramer's $V = 0.09$; most younger

Figure 1
Children's Racial Classifications in the Parental Heritage Task



Note. Target A had two White parents but had a medium skin tone; Target B had two Black parents but had a light skin tone. Results are split by participant age group (5–7 years vs. 10–12 years) and culture (United States vs. Brazil). Asterisks represent statistically significant cultural differences in racial categorization patterns for that age group based on the chi-square analysis. See the online article for the color version of this figure.
** $p < .01$. *** $p < .001$.

children again privileged skin tone and categorized the sibling as White (67%). Notably, when considering categorization across the two sibling targets, 80% of younger children categorized siblings as *different* races.

As in the parental heritage task, there were significant cultural differences among older children when categorizing the sibling with the skin condition, $\chi^2(2) = 20.86$, $p < .001$, Cramer's $V = 0.55$. Older U.S. children categorized this sibling as Mixed (48%) or Black (26%), with 26% categorizing the sibling as White. Almost all Brazilian children privileged skin tone and categorized the sibling as White (81%). In line with the view that race is based on heritage, the majority of older U.S. children (59%) made *same* race classifications for the siblings. Yet, in line with the skin tone conception of race, almost all older Brazilian children (95%) made *different* race classifications for the siblings.

Skin Tone Change Task

There were no cultural differences in categorization of the child with darker skin at baseline (Figure 3A) among younger children, $\chi^2(2) = 3.38$, $p = .18$, Cramer's $V = 0.25$, or older children, $\chi^2(2) = 0.00$, $p = 1.00$, Cramer's $V = 0.00$; the child tended to be categorized as Black across all participants (70%).

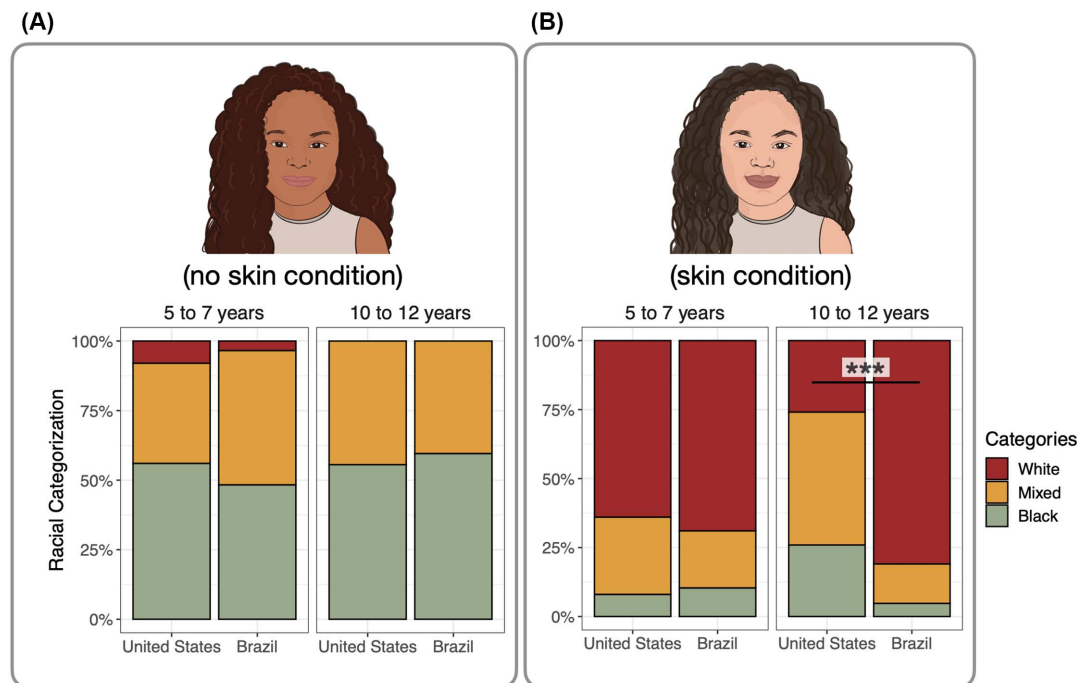
When the child's skin tone lightened 1 year later (Figure 3B), the majority of younger children (70%) categorized the child as White; there were no cultural differences in categorization, $\chi^2(2) = 5.84$, $p = .05$, Cramer's $V = 0.33$. Across the two time points, 76% of younger children changed their racial categorizations, again indicating the view that race is determined by skin tone.

There were significant cultural differences among older children when categorizing the child 1 year later, $\chi^2(2) = 12.72$, $p = .002$, Cramer's $V = 0.43$. The modal response among U.S. children was to categorize the child as Mixed (48%), while most Brazilian children categorized the child as White (76%). Across time points, 63% of older U.S. children changed their racial categorizations of the child, while almost all older Brazilian children (90%) changed categorization.

Race Concept Composite Score

We next examined the race concept composite score that indicated the extent to which children endorsed a race = skin tone concept. Recall that this score was the sum of all three tasks, coded as 1 = privileged skin tone and 0 = not (possible range = 0–3). The Poisson regression indicated a significant Age Group \times Culture interaction, $B = -0.86$, $p < .001$, 95% CI $[-1.26, -0.46]$. As shown

Figure 2
Children's Racial Classifications in the Biological Siblings Task



Note. Siblings shared the same parents but differed in skin tone; Sibling A had darker skin, while Sibling B had lighter skin due to a skin condition. Results are split by participant age group (5–7 years vs. 10–12 years) and culture (United States vs. Brazil). Asterisks represent statistically significant cultural differences in racial categorization patterns for that age group based on the chi-square analysis. See the online article for the color version of this figure.

*** $p < .001$.

in Figure 4, younger children across cultures tended to endorse that race is determined by skin tone, while older U.S. children shifted away from this concept (i.e., toward ancestry), and Brazilian children's race = skin tone concept strengthened.

Robustness Checks of Race Concept Composite Analysis

For robustness, we examined if the Age \times Culture interaction predicting the race concept composite score held across (a) target gender (boy vs. girl targets) and (b) participant race. The interaction was robust to both factors. Regardless of target gender, the race = skin tone score decreased with age for U.S. children (boy targets: from 2.33 to 1.41; girl targets: from 2.46 to 1.20) but increased with age for Brazilian children (boy targets: from 2.00 to 2.87; girl targets: from 2.23 to 2.63); the Age \times Culture interactions were significant in models that split the data by girl and boy targets (girl targets: $B = -0.88$, $p = .01$, 95% CI $[-1.59, -0.18]$; boy targets: $B = -0.86$, $p < .001$, 95% CI $[-1.36, -0.36]$). Similarly, the race = skin tone score decreased with age for all U.S. racial groups (Asian: from 2.83 to 0.50; Latine/x: from 2.50 to 1.50; Multiracial: from 2.14 to 0.20; White: from 2.36 to 1.71) but increased with age for all Brazilian racial groups (Black: from 2.20 to 2.50; Multiracial: from 2.00 to 2.84; White: from 2.17 to 2.76); the Age \times Culture interactions were significant in the models that split the sample by White and Children of Color (White participants: $B = -0.56$,

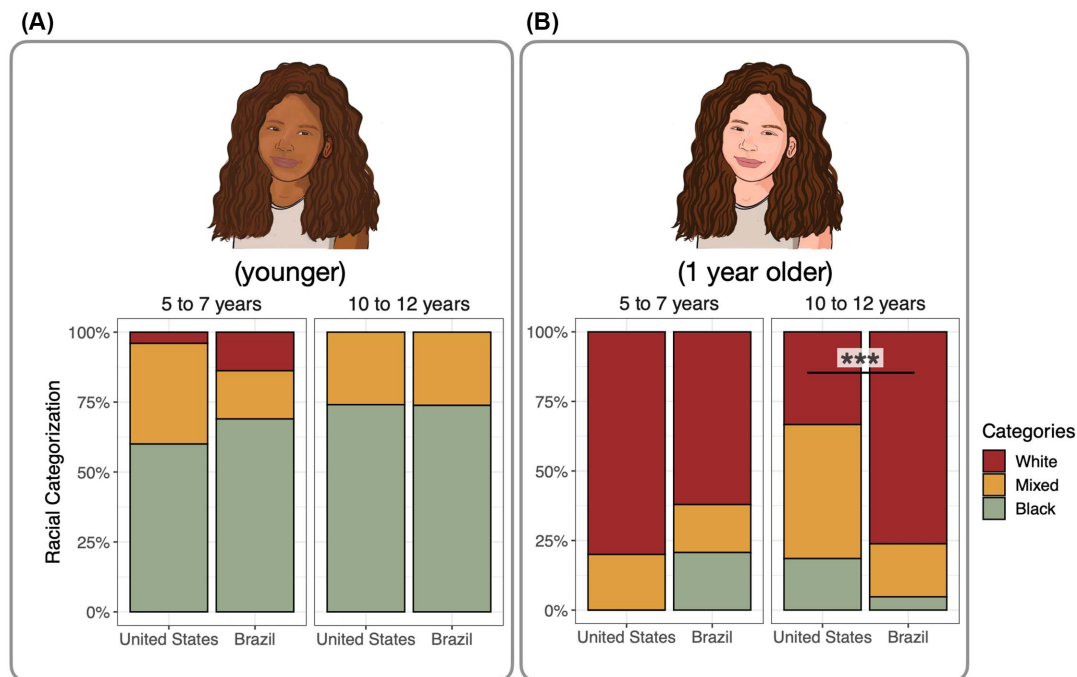
$p = .01$, 95% CI $[-1.00, -0.13]$; Children of Color participants: $B = -1.26$, $p = .001$, 95% CI $[-2.03, -0.48]$).

Rigidity of White Racial Categorization

Finally, we were interested in the rigidity of children's White racial categorization of targets who had lighter skin and African ancestry. In models that predicted White (vs. not) categorization, there were significant Age Group \times Culture interactions for categorizing the child with Black parents who has light skin (Figure 1B), $B = -3.96$, $p < .001$, 95% CI $[-6.03, -2.11]$, $OR = 0.02$; the sibling who has lighter skin due to a skin condition (Figure 2B), $B = -2.27$, $p = .006$, 95% CI $[-3.93, -0.68]$, $OR = 0.10$; and the child whose skin tone changed from dark to light (Figure 3B), $B = -2.75$, $p < .001$, 95% CI $[-4.44, -1.15]$, $OR = 0.06$. These interactions converged on the result that older U.S. children were less likely than all other demographic groups (i.e., older Brazilian children, younger U.S. and Brazilian children) to categorize these targets as White, in line with the U.S. ancestry-based view of race and the historical purpose to make the White racial category exclusive to those with only European ancestry. When analyzing all three targets together in a multilevel logistic regression, we find an overall Age \times Culture interaction of $B = -4.66$, $p < .001$, 95% CI $[-6.88, -2.44]$, $OR = 0.01$.

Notably, older U.S. children were not *always* more rigid in categorizing individuals as White; rather, they were sensitive to

Figure 3
Children's Racial Classifications in the Skin Tone Change Task



Note. The target had lighter skin when they were younger (A) and then their skin lightened a year later (B). Results are split by participant age group (5–7 years vs. 10–12 years) and culture (United States vs. Brazil). Asterisks represent statistically significant cultural differences in racial categorization patterns for that age group based on the chi-square analysis. See the online article for the color version of this figure.

*** $p < .001$.

ancestry information. Specifically, a significant Age \times Group interaction for the child with White parents who has a medium skin tone (Figure 1A), $B = 3.00$, $p = .020$, 95% CI [0.71, 6.18], $OR = 20.10$, indicated that older U.S. children were *more* likely than older Brazilian children to categorize the child as White when presented with evidence that the child had two White parents.

We also examined children's categorizations of targets who had the potential to be categorized as Mixed or Black, given that they had medium to dark skin tones and evidence of African ancestry (Figures 2A and 3A). Indeed, it was possible that there would also be cross-cultural differences in classification of these targets, for example, if Brazilian children are more comfortable using the "Mixed" label given the much larger population of Brazilian people who identify with this category. However, when analyzing these two targets together in multilevel logistic regressions, there were no significant Age \times Culture interactions predicting Black (vs. not) racial classification, $B = -0.14$, $p = .90$, 95% CI [-2.29, 2.00], $OR = 0.87$, nor Mixed (vs. not) racial classification, $B = -0.02$, $p = .99$, 95% CI [-2.36, 2.32], $OR = 0.98$. For example, for the sibling with darker skin (Figure 2A), while there is clearly heterogeneity *within* each culture and age group in whether this sibling was classified as Black or Mixed, this pattern was consistent *across* cultures. Thus, cross-cultural divergence in racial classifications was specific to older children's White racial categorization.

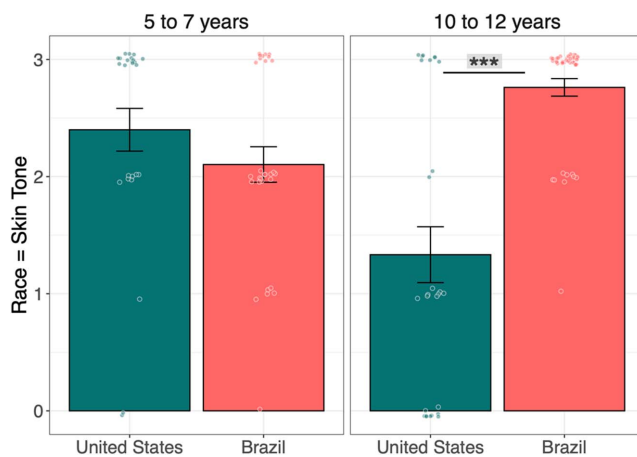
Discussion

Societal racial classification systems have widespread social, political, and economic implications (Davenport, 2020; Janusz, 2023; Roberts & Rizzo, 2021; Roth et al., 2023), yet psychological research has focused almost exclusively on U.S.-centric views of race, and little research has examined how race is learned across development and cultures. In the present cross-cultural investigation of this issue, we found that younger children (5–7 years) tend to view race as being determined by skin tone regardless of their society's classification system. In contrast, we found that older children's (10–12 years) race concepts diverge in line with their society's views, with U.S. children shifting toward ancestry and Brazilian children privileging skin tone even more strongly with age. Notably, these patterns were robust to whether the targets being classified were male or female and to children's own racial group membership. Moreover, we found that cross-cultural differences were driven by White racial categorization, which historically was a key motivation for each society's distinct racial classification systems.

By taking an international, cross-cultural perspective, our results offer new insights into the early social construction of race. First, conceptualizing racial classification based on skin tone appears to be the more intuitive concept (Dunham et al., 2015). One explanation is that skin color is a perceptually salient feature, and young children may be attuned to the strong correlation between racial labels and skin color (as opposed to other observable features,

Figure 4

Children's Race Concept Composite Scores, Split by Participant Age Group (5–7 Years vs. 10–12 Years) and Culture (United States vs. Brazil)



Note. The composite score was the sum score of the three individual tasks, in which each task was coded as 1 = privileged skin tone over ancestry information versus 0 = not, with a possible range of 0–3. The highest score of 3 indicated that the child privileged skin tone over ancestry information across all three tasks. Asterisks represent statistically significant cultural differences for that age group based on the regression analyses. See the online article for the color version of this figure.

*** $p < .001$.

such as hair color; Bigler & Liben, 2006). The fact that children flexibly update their racial classification if a person's skin tone changes aligns with prior research suggesting racial essentialism may not be consistently present during early childhood (Kinzler & Dautel, 2012; Rhodes & Gelman, 2009; Rhodes & Mandalaywala, 2017; Roberts & Gelman, 2016, 2017). Notably, there are categories (e.g., gender, animal kinds) in which children do prioritize unobservable essences over superficial appearance information (Taylor et al., 2009), yet race does not operate in this way.

Second, our finding that race concepts diverge by the ages of 10–12 indicates that cultural input about race is influential across middle to late childhood (Kinzler & Dautel, 2012; Pauker, Xu, et al., 2016; Rhodes & Gelman, 2009; Rhodes & Mandalaywala, 2017). In a similar vein, Rhodes and Gelman (2009) found that children's views of race as an objective versus subjective category aligned more strongly with their cultural context around age 10. Notably, in the present study, cross-cultural divergence in race concepts was driven by older children's differing views of who counts as White (i.e., Brazilian but not U.S. children maintain a more expansive view). Given that being classified as White is associated with high status in both the United States and Brazil, this finding could suggest that a mechanism underlying developmental change in understanding racial classification systems is older children's increased attention to which groups are granted high societal status (for more on children's sensitivity to social status, see Amemiya et al., 2023; Shutts, 2015).

In addition to social status, there are a wide variety of potential contributors that could be affecting children between the ages of 7–10, such as the makeup of their neighborhoods, the media they

are exposed to, and the language input from knowledgeable adults (Lei & Rhodes, 2021; Leshin et al., 2022; Moty & Rhodes, 2021; Roberts & Rizzo, 2021). Interactions with peers may also shape race concepts among children in this age range (McGlothlin et al., 2005).

Although we found that cultural differences emerge in later childhood, we also found that older children in both cultures were still heavily influenced by appearance. For example, the majority of older children—U.S. children included—endorsed that a person's race changed if their skin tone changed. This suggests that further development in race concepts occurs after age 12; for example, there is likely greater socialization about the role of ancestry in determining race. Indeed, our adult data indicate that ancestry becomes increasingly important in racial categorization across both cultures, though more so in the United States than Brazil. Beyond direct socialization through parent–child discussions (Hughes et al., 2006), there may be other cues to the importance of ancestry, such as the popularity of genetic ancestry testing, discussions of ancestry in politics, and public controversies about racial identity (e.g., whether Rachel Dolezal should identify as Black given that she does not have African ancestry).

For the sibling task, we found that most younger children (and older Brazilian children) classified siblings with different skin tones as different races. One limitation of this task was that we described the skin tone difference as arising from one sibling having a skin condition, and it is possible that younger children understood this concept differently than older children. This could have been the case even though we provided some information about what was meant by “skin condition” by contrasting it with being born with a particular skin tone, and even though younger children, like older children, had no trouble identifying on an attention check question asking which sibling had a skin condition. It is also interesting to consider whether the specific causal explanation for a person's skin tone matters, such as whether the results would be different if lightening or darkening makeup was used as the explanation.

Another limitation was that data collection strategies across countries were not directly comparable; we interviewed U.S. children over Zoom and Brazilian children in person. However, this difference cannot account for the developmental differences observed *within* each cultural context. It is also notable that we found cross-cultural differences among adults who were all interviewed over Zoom. Thus, it is highly unlikely that the differences in data collection can account for the cross-cultural differences observed in children.

To assess racial categorization, we had participants label the targets as White, Mixed, or Black, which differs from approaches that have participants group images of targets together (e.g., Albuja et al., 2024). This choice was made to address our question of how individuals are racially classified (i.e., what race terms are assigned to people) and raises broader questions about the link between language and concepts. Our findings suggest that “race” is synonymous to “skin color” in Brazil but becomes increasingly synonymous with “ancestry” in the United States. Similarly, “White” appears to be synonymous with “light-skinned” in Brazil but becomes increasingly synonymous with “solely of European ancestry” in the United States. We propose that the linguistic differences in what race and racial terms mean reflect deeper conceptual differences, much like how word embeddings reveal collective concepts by quantifying which words are expressed together (A. H. Bailey et al., 2022). Relatedly, the fact that Brazil has had a formal racial term, Pardo/a, for

the Multiracial category much longer than the United States may affect how people reason about race, such as conceptualizing race as being along more of a (fluid) continuum.

Our findings also raise questions about how ancestry- and skin tone-based racial ideologies may interact. For example, although U.S. children shift from a skin tone to ancestry conception of race, it is likely that early intuitions about race as skin tone coexist with these newer beliefs (see Shtulman & Valcarcel, 2012). The salience of skin tone early in development may make children susceptible to cultural messages that perpetuate *colorism* (i.e., systematic biases in favor of lighter skin tones), which are pervasive in the United States and internalized in childhood (Abrams et al., 2020). Coexistence of the two racial belief systems may contribute to why, by adulthood, ancestry views of race shape more *deliberate* societal processes (e.g., political affiliations formed on the basis of shared African ancestry), yet biases and inequalities based on skin tone are still highly prevalent (Monk, 2015).

Furthermore, an understanding of both racial concepts may result in identity conflicts and racial fluidity. Indeed, many Brazilians report identity conflicts and have changed how they identify racially (De Micheli, 2021; Joseph, 2015). Politician Cristovam Andrade, who is of mixed African and European ancestry, changed his racial identification from White to Black in adulthood stating, “I am going to mark Black as a way to recognize my ancestry and origin. ... Outside of Brazil, we would never be considered White” (McCoy & Traiano, 2020).

Research should also investigate the consequences of these racial concepts, such as whether individuals who have lighter skin and African ancestry are classified as White in Brazil and granted higher status than in the United States (Joseph, 2015). Finally, while we focus on cross-cultural differences, there are likely *within*-cultural differences in the development of race concepts. For example, prior research has shown that children’s own racialized experiences (e.g., being a member of a racial minority vs. majority group) and the racial diversity of their social context lead to systematic differences in children’s race understanding and attitudes *within* the United States (Albuja et al., 2024; Pauker, Xu, et al., 2016; Rhodes & Gelman, 2009; Roberts & Gelman, 2016) and *within* Brazil (Sacco et al., 2019). Although we find that the current developmental patterns are robust to children’s own racial background and target gender, further research should explore other potential influences on how children racially classify others. Overall, the current research provides novel cross-cultural evidence regarding how racial classification systems are learned in development and regarding cultural variability in the development of race concepts.

Constraints on Generality

The present investigation focused on the United States and Brazil, and more research is needed on how race is constructed in other societies. Here, we studied countries that varied in whether race was historically linked to ancestry versus skin tone. Future work could explore other historical factors, such as comparing countries with and without a history of European colonization, as these factors likely shape how racial classification systems are currently defined. Indeed, the present work is only a first step in understanding how racial ideologies persist across generations.

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