

# Journal of Experimental Psychology: General

## How Race and Gender Shape the Development of Social Prototypes in the United States

Ryan F. Lei, Rachel A. Leshin, Kelsey Moty, Emily Foster-Hanson, and Marjorie Rhodes

Online First Publication, December 23, 2021. <http://dx.doi.org/10.1037/xge0001164>

### CITATION

Lei, R. F., Leshin, R. A., Moty, K., Foster-Hanson, E., & Rhodes, M. (2021, December 23). How Race and Gender Shape the Development of Social Prototypes in the United States. *Journal of Experimental Psychology: General*. Advance online publication. <http://dx.doi.org/10.1037/xge0001164>

# How Race and Gender Shape the Development of Social Prototypes in the United States

Ryan F. Lei<sup>1</sup>, Rachel A. Leshin<sup>2</sup>, Kelsey Moty<sup>2</sup>, Emily Foster-Hanson<sup>3</sup>, and Marjorie Rhodes<sup>2</sup>

<sup>1</sup> Department of Psychology, Haverford College

<sup>2</sup> Department of Psychology, New York University

<sup>3</sup> Department of Psychology, Princeton University

The present studies examined how gender and race information shape children's prototypes of various social categories. Children ( $N = 543$ ;  $M_{\text{age}} = 5.81$ , range = 2.75–10.62; 281 girls, 262 boys; 193 White, 114 Asian, 71 Black, 50 Hispanic, 39 Multiracial, 7 Middle-Eastern, 69 race unreported) most often chose White people as prototypical of *boys* and *men*—a pattern that increased with age. For female gender categories, children most often selected a White girl as prototypical of *girls*, but an Asian woman as prototypical of *women*. For superordinate social categories (*person* and *kid*), children chose members of their own gender as most representative. Overall, the findings reveal how cultural ideologies and children's own group memberships interact to shape the development of social prototypes across childhood.

**Keywords:** race, gender, prototypes, intersectionality, representation

**Supplemental materials:** <https://doi.org/10.1037/xge0001164.supp>

Even as the United States becomes increasingly racially and ethnically diverse, White men remain overrepresented in positions of power. For example, as of 2020, 100% of U.S. Presidents have been men, and all but one was White; at the 16 Fortune 500 companies that share detailed employee demographic information, 80% of current senior executives are men, and 72% of them are White men (Jones, 2017); and of university presidents, 70% are men, and 83% of them are White men (American Council on Education, 2017). Such disparities persist, in part, because people draw upon their entrenched representations of social categories—that is, their *prototypes*—when considering everyday decisions like who is the best “fit” for a new hire or whom to support for President. And in the United States, adults tend to think of White people and men (and often White men, specifically) as prototypical of *people* (e.g., Bailey et al., 2019; Hegarty, 2017; Purdie-Vaughns & Eibach, 2008).

Because they are central, clear representatives of their categories (e.g., Rosch et al., 1976) and readily come to mind (e.g., Anglin, 1986), category prototypes play a critical role in our ability to efficiently navigate the world (e.g., Rosch, 1973). Despite these efficiencies, prototypes of *social* categories can have pernicious consequences. For example, among adults, the tendency to bring to mind certain kinds of people (e.g., White people or men) when considering who is prototypical of a leader (Rosette et al., 2008), a new employee (Bertrand et al., 2005), or even a romantic partner (Galinsky et al., 2013) can result in systematic patterns of discrimination.

People begin to develop category prototypes in early childhood (Mervis & Pani, 1980), so understanding how children incorporate race and gender into their social prototypes across development is crucial for addressing these broader issues of social inequality. For example, if children believe White people are representative of men, and also that men are most prototypical of various high-status social roles (e.g., President; Greenlee et al., 2020), then over a lifetime this may manifest and reinforce a belief that White men are the default choice to lead society. More perniciously, the belief that White men are the prototype for these high-status positions may also preclude people from considering candidates who are not White or men, or even inspire backlash against people from minoritized backgrounds (e.g., Okimoto & Brescoll, 2010; Livingston et al., 2012). However, whether and how children systematically incorporate race and gender in their social prototypes across development is largely unknown.

The present work considered two interrelated questions. First, we asked how race biases children's representations of gender categories (*men*, *women*, *boys*, and *girls*; e.g., how does race shape who children think of as a prototypical man?). Second, we investigated how both race and gender interact to bias children's representations

Research reported in this publication was supported by the James S. McDonnell Foundation (Award 24-91551-WSQPG-R4993) and the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health under Award R01HD087672 (both to Marjorie Rhodes) and a National Science Foundation Award (BCS-2122112) to Ryan F. Lei. The content is solely the responsibility of the authors. We thank the Children's Museum of Manhattan, as well as the children and families of PS 132 The Conselyea School, for partnering in this research. Materials for this research can be found at: <https://osf.io/qfceb/>.

Correspondence concerning this article should be addressed to Ryan F. Lei, Department of Psychology, Haverford College, 370 Lancaster Avenue, Haverford, PA 19043, United States. Email: [rlei1@haverford.edu](mailto:rlei1@haverford.edu)

of more superordinate social categories (*people* and *kids*; e.g., who do children think of as a prototypical person?). In both cases, we tested how these effects emerge across age in childhood, as children become more immersed in cultural ideologies and stereotypes that favor some groups over others.

### How Race Biases Children's Representations of Gender

In thinking about how race might bias children's gender concepts, one possibility is simply that it does not—that young children think about gender and race separately, and that when they focus on gender, they pay little attention to race information. Indeed, children often appear to pay more attention to gender than race when the two types of categories are examined separately. For example, 3-year-old White children use gender- but not race-based similarities to decide who to be friends with (Shutts et al., 2013) and choose toys and activities endorsed by same-gender children more than same-race children (Shutts et al., 2010). In these prior studies investigating the influence of race on children's social preferences, however, both of the possible social partners often matched the participating child's gender (e.g., Renno & Shutts, 2015; Shutts et al., 2010)—leaving open the question of how race and gender information might interact to shape children's social decisions.

Comparing how children think about gender and race in separate trials or experiments (as has been common in previous research; e.g., Rhodes & Gelman, 2009; Waxman, 2010) does not address how children think about the *intersection* of these categories (Cole, 2009). Instead, asking children to consider stimuli one at a time (i.e., a more exemplar-based approach) is better suited to this question because it allows children to draw on whatever information they view as meaningful. For example, Perszyk and colleagues (Perszyk et al., 2019) used an exemplar-based measure of implicit attitudes to assess children's immediate affective reactions to pictures of Chinese characters that followed primes of individual children who varied by race and gender. The predominately White sample of 4-year-old children evaluated the neutral Chinese characters more negatively when they followed pictures of Black boys, specifically, relative to White boys, White girls, and Black girls—suggesting that children's immediate affective reactions varied as a function of the intersection of race and gender.

Given that children are sensitive to the intersection of race and gender by at least age 4, race could shape the development of children's gender representations in a number of ways not revealed by prior work. Specifically, two key theoretical perspectives on intersectionality from the adult social psychological literature provide guidance for how race and gender might intersect in children's minds. First, gendered-race theory (Johnson et al., 2012) suggests that people consider overlapping stereotype content in generating gendered-race prototypes (see also Brewer et al., 1981 for the perspective of stereotypes-as-prototypes). From this perspective, overlapping stereotypes about *men* and *Black people* (e.g., "aggressive") lead people to think of Black men as highly prototypical of their gender category (and Black women as less so). Similarly, overlapping stereotypes about *women* and *Asian people* (e.g., "passive") lead people to think of Asian women as prototypical of their gender category (and Asian men as less so). This theory does not make strong predictions for gendered associations with Whiteness.

Alternatively, intersectional invisibility theory (Purdie-Vaughns & Eibach, 2008) contends that intersectional social prototypes reflect broader ideologies of androcentrism (favoring men) and ethnocentrism (favoring White people, in the United States) that serve to maintain the social system and status quo. From this perspective, Whiteness and maleness are seen as cultural defaults in the United States and are hypothesized to exert an influence on even our perceptions of subordinated groups. For example, although women are a subordinated gender group relative to men, Whiteness is still maintained in people's representations of *women*. Thus, intersectional invisibility holds that White men and women are seen as more prototypical of their respective gender categories (and racial minorities as less prototypical).

Neither of these theories makes specific developmental predictions, and previous work from children is compatible with both accounts. In a recent study, Lei and colleagues (Lei et al., 2020) asked 4- to 8-year-old children to categorize pictures of Black, White, and Asian men and women by gender in a speeded categorization task. Children (who were themselves Black, White, Asian, or Biracial) were slower and less accurate to categorize the gender of Black women relative to White and Asian women, as well as to Black men—an effect that strengthened over age (and was replicated in an older sample of children; Leshin et al., 2021). Because people are faster to categorize more prototypical exemplars, these findings suggest that children viewed Black women as least prototypical of their gender category (i.e., *women*), consistent with both gendered-race theory and intersectional invisibility theory. There were no differences in categorization speed or accuracy for male stimuli, nor any variation based on children's own race or gender group memberships—a somewhat surprising finding given well-documented own-race (e.g., Anzures et al., 2013) and own-gender biases (e.g., Wright & Sladden, 2003) in recognition and memory processes.

The present work uses a more direct measure of children's category prototypes with a larger sample of children from both White and racially minoritized backgrounds. Here, we test the predictions generated by the various theoretical perspectives outlined above regarding how race might bias children's gender prototypes. In addition to the predictions of these two theoretical accounts, we considered that children's own group memberships might shape their mental representations (such that children may view own-race faces as more representative of gender categories). Although children's racial background did not consistently predict their behavior in Lei et al. (2020), we thought it might do so in the present, nonspeeded task because children would have more time to explicitly compare themselves to the presented stimuli.

Finally, we considered that if race did indeed bias children's gender representations (in any of the patterns predicted by the theories outlined), this effect might strengthen over age, as children have more experiences with culturally situated stereotypes, ideologies, and hierarchies. This hypothesis is derived in part from empirical work reported by Lei and colleagues (Lei et al., 2020), where the integration of race and gender information occurred across early to middle childhood. More theoretically, we hypothesize that age-related changes might occur as children become more aware of cultural ideologies and societal stereotypes (Pauker et al., 2010), become increasingly attentive to gender- and race-based status hierarchies (Mandalaywala et al., 2019), and begin to internalize their own social group memberships (e.g., Dulin-Keita et al., 2011).

## How Gender and Race Shape Children's Representations of *People* and *Kids*

We also considered how race and gender may interact to shape children's representations of the more superordinate categories of *people* and *kids*. Because intersectional invisibility theory (Purdie-Vaughns & Eibach, 2008) indicates that Whiteness and maleness are viewed as cultural default identities in the United States, this theory predicts that children will view White men as the prototypical *person*. In contrast, gendered-race theory does not specifically address how race and gender overlap in representations of superordinate categories.

Compared with children's prototypes of gender categories (where initial evidence suggests no consistent influence of children's own group membership; Lei et al., 2020), children's prototypes of broader social categories like *people* may be more sensitive to children's own group memberships. Indeed, adults often project characteristics of their ingroup onto their prototypes of the broader, superordinate group (e.g., Wenzel et al., 2008; Wenzel, 2001); for example, Germans think of themselves as more representative of Europeans than Portuguese people (Imhoff et al., 2011). Children do so as well—when asked to draw a person, children often draw someone of their own gender (Arteche et al., 2010; Houston & Terwilliger, 1995). From this perspective, we expect children to primarily display an own-gender bias in their prototypes of *people* and *kids*, such that boys will select male stimuli and girls will select female stimuli. However, it is less clear whether children also account for race in this ingroup projection. Gender is an early emerging and relatively stable social identity (Maccoby, 1988; Martin & Ruble, 2004), particularly compared with race (but see Kinzler & Dautel, 2012; Roberts & Gelman, 2017, for evidence that Black children view race as a more stable component of a person's identity from an earlier age than do White children). For these reasons, we expect children to primarily exhibit an own-gender bias in their representations of superordinate categories but to begin to account for race at older ages, as it becomes more stable and meaningful to them. These broad perspectives of how children might consider race and gender in their representations of *people* and *kids* (i.e., intersectional invisibility theory, gendered race theory, and group-based processes) are not mutually exclusive and may interact.

In the current set of studies, we examined how the race and gender of both the stimuli and the participants themselves influence the development of social prototypes. In Study 1, we asked children to choose who they thought was prototypical of the *men*, *women*, and *people* categories. In Study 2, we asked children to choose who they thought was prototypical of the same categories as in Study 1, as well as for the *boys*, *girls*, and *kids* categories. All data and analysis scripts are available on the Open Science Framework (2021; [https://osf.io/qfceb/?view\\_only=43e7400f2e16418d922407ce0644c29e](https://osf.io/qfceb/?view_only=43e7400f2e16418d922407ce0644c29e)).

### Study 1

#### Method

##### Participants

Between March and September of 2018, we recruited 178 children to participate from a children's museum in New York City. Children were between 3 and 10 years old ( $M_{\text{age}} = 6.10$ ,  $SD =$

1.67, range = 3.09–10.62; 96 girls [54%] and 82 boys [46%]). Because this study was more exploratory, we aimed to test 30 children of each participant Race  $\times$  Gender combination reflected in the stimuli to test the role of children's own gender and race in their social prototypes. Due to logistical changes at the testing site, we were unable to fully reach our planned sample of Black children within the available timeframe for testing. Most children were from middle to upper-middle class backgrounds, though we also recruited during free days at the museum to help diversify the socioeconomic status backgrounds of our sample. Our final sample included 70 White children (39%), 62 Asian children (35%), and 46 Black children (26%).

##### Prototype Selection Task

**Introduction.** First, children were introduced to a cartoon alien ("Feppy") who, they were told, did not know many of the things they knew but wanted to learn about our world; children were asked to help make a book to teach Feppy. This method has been used in prior developmental research to probe beliefs about typicality, as people often teach about categories using the exemplars they view as the most representative (Foster-Hanson & Rhodes, 2019; Rhodes et al., 2008).

**Warmup Trials.** To familiarize children with the task, children first completed two practice trials: one with shapes and one with fruit. For example, for the shape trials, children saw a circle, a triangle, and a square, and were asked, "Which would you put in the book to teach Feppy about triangles?" Most children (93%) answered correctly on at least one trial; all data were retained for analyses.

**Critical Trials.** Next, children completed a series of critical trials with pictures of people. We assessed children's prototypes of three different social categories: *people*, *men*, and *women*. The *people* trial always came first, because we were concerned that picking an exemplar for the gendered categories (*men*, *women*) first could bias later responses to the more superordinate (*people*) category. The two gendered trials were presented in randomized order. Stimuli consisted of adult faces drawn from the Chicago Face Database (Ma et al., 2015), matched on perceived age and attractiveness within trial. For the *people* trials, children saw a total of six faces, one of each race (Black, White, or Asian)  $\times$  gender (male or female) combination. For the gendered trials (*men*, *women*), children saw three pictures of (Black, White, and Asian) men or women, depending on the trial.

For each category, children viewed two blocks, and each block contained two trials. On the first trial, children were asked to select the exemplar they thought was the best one to teach Feppy about the category (e.g., "Feppy wants to learn about *men*. Which one is the best one to teach Feppy about *men*?"). On the second trial, children saw the same set of faces (arranged in the same order) and were asked to pick the *next* best exemplar to teach Feppy about the category, though children could select the same exemplar again if they wanted to. We included this second trial as a measure of the graded structure of children's social prototypes (Rosch & Mervis, 1975). The second block for each category was structured identically, to get a more stable estimate of children's representations. All procedures were approved by the NYU Institutional Review Board (IRB-FY2016-760).



## Analytic Strategy

We analyzed children's selections using R Version 1.1.463. We used linear mixed models, nesting stimulus within participant and specifying a binomial distribution, and included a random fixed effect for participant. Because there were three possible choices for each gender trial and six possible choices for the superordinate *person* trials, predicted means should be viewed as the likelihood of picking a given stimulus (i.e., chance levels are 1/3 (33.3%) for gender trials and 1/6 (16.7%) for superordinate trials). We also modeled random slopes for the interaction between trial and block, which allowed us to make inferences about the generalizability of results (Westfall et al., 2014). We ran separate models for each category and tested for main and interactive effects of stimulus race and stimulus gender (where appropriate). We also tested for moderation by participant age (mean-centered), participant gender, and participant race. For all main and interactive effects, we report the results from Type II Wald  $\chi^2$  tests using the Anova function from the car package in R (Fox et al., 2012), since the Type II sum of squares allows for accurate estimates of lower-level interactions that are not adjusted based on the inclusion of higher-level interactions. When examining changes across age, we report unstandardized beta coefficients. All analyses in Study 1 were exploratory and not preregistered.

## Results

### Men Trials

Overall, children were more likely to choose a White man than an Asian or Black man to best represent *men* (main effect of stimulus race,  $\chi^2 = 8.64$ ,  $df = 2$ ,  $p = .013$ ). These effects emerged across age; children's tendency to choose White men increased with age ( $b = .15$ ,  $SE = .05$ ,  $z = 3.02$ ,  $p = .003$ ), whereas their selections of Black men ( $b = .07$ ,  $SE = .05$ ,  $z = 1.33$ ,  $p = .185$ ) and Asian men ( $b = -.04$ ,  $SE = .05$ ,  $z = -.67$ ,  $p = .50$ ) remained constant across age (interaction between stimuli race and participant age,  $\chi^2 = 6.32$ ,  $df = 2$ ,  $p = .042$ ; see Figure 1). There were no main or interactive effects of participant gender or race (all  $ps > .10$ ).

### Women Trials

Children's selections of who best represents *women* did not vary as a function of the race of the stimuli ( $\chi^2 = 3.44$ ,  $df = 2$ ,  $p = .179$ ), nor by participant gender, race, or age (all  $ps > .20$ ).

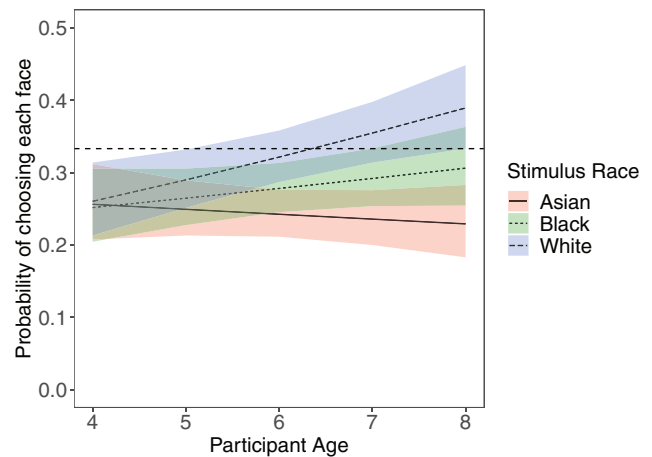
### People Trials

Children's selections of who best represents *people* revealed an own-gender bias: Boys were more likely to pick men, and girls were more likely to pick women (interaction between participant and stimuli gender,  $\chi^2 = 108.23$ ,  $df = 1$ ,  $p < .001$ ; see Figure 2A). The strength of this own-gender bias, however, was moderated by participant race ( $\chi^2 = 7.89$ ,  $df = 2$ ,  $p = .019$ ; see Figure 2B) and participant age ( $\chi^2 = 6.20$ ,  $df = 1$ ,  $p = .013$ ; see Figure 3).

With respect to participant race, White girls showed a stronger own-gender bias than either Black or Asian girls (for girls, participant race by stimulus gender interaction,  $\chi^2 = 6.05$ ,  $df = 2$ ,  $p = .048$ ), whereas participant race did not moderate the strength of boys' own-gender bias (for boys, participant race by stimulus gender interaction,  $\chi^2 = 3.31$ ,  $df = 2$ ,  $p = .191$ ). With respect to

**Figure 1**

*Children's Predicted Probability of Picking a Person of Each Race as the Best Representation of Men as a Function of Participant Age*



*Note.* Error bands represent 95% confidence intervals (CIs). There were three faces shown per trial; the dotted horizontal line represents chance responding. See the online article for the color version of this figure.

participant age, girls were less likely to pick their own gender with age ( $\chi^2 = 13.23$ ,  $df = 1$ ,  $p < .001$ ), whereas boys' own-gender preferences did not change with age ( $\chi^2 = .002$ ,  $df = 1$ ,  $p = .96$ ). Finally, we observed a two-way interaction between stimulus gender and stimulus race that did not interact with participant characteristics ( $\chi^2 = 7.16$ ,  $df = 2$ ,  $p = .028$ ); as shown in Figure 4, this interaction was driven primarily by children's lower likelihood of selecting Asian men as representative of *people* compared with Asian women.

## Discussion

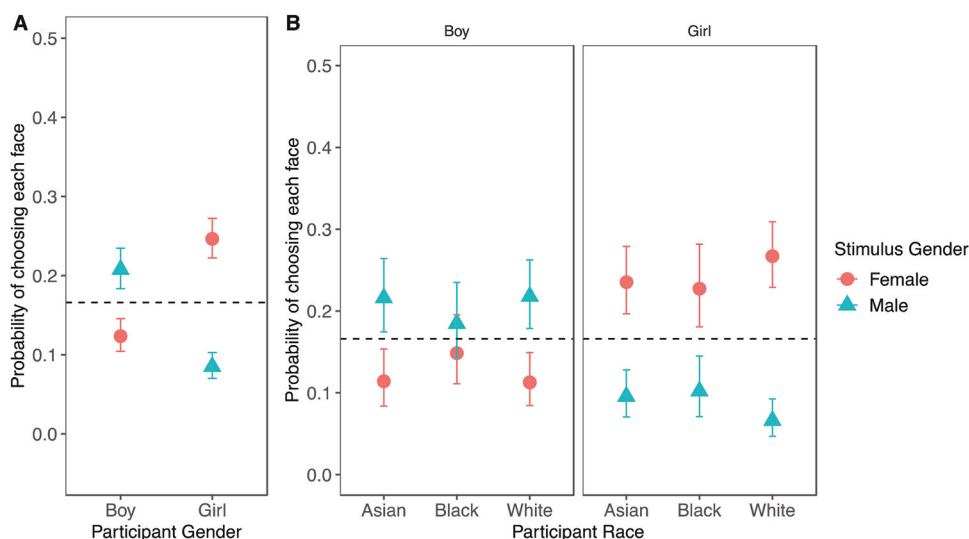
Children picked White men as best representing the category of *men* and did so increasingly with age—a pattern consistent with the hypothesis derived from intersectional invisibility theory that treating White as the default cultural identity emerges across childhood and influences the formation of social prototypes. In contrast, children's prototypes of *women* did not consistently incorporate race information.

Children's beliefs about who best represents the category of *people* appeared to be driven by own-gender biases: children tended to pick people of their own gender to best represent *people*, though girls' tendency to do so declined with age. In addition to the clear role of children's own gender in shaping representations of *people*, children were also less likely to pick Asian men to represent *people* than any other group. This marginalization of Asian men could reflect an extension of gendered-race theory to superordinate social categories, though this interpretation is made with caution, as gendered-race theory does not make specific predictions about superordinate social categories.

The findings that children did not appear to incorporate race information into their representations of *women* is somewhat at odds with Lei et al. (2020) and Leshin et al. (2021), which found that children were slower and less accurate to categorize the gender of Black women (relative to White women, Asian women, and Black

**Figure 2**

*Children's Predicted Probability of Picking a Particular Face as the Best Representation for the People Category as a Function of Participant Gender  $\times$  Stimulus Gender (A Left) or Participant Gender, Stimulus Gender, and Participant Race (B Right)*

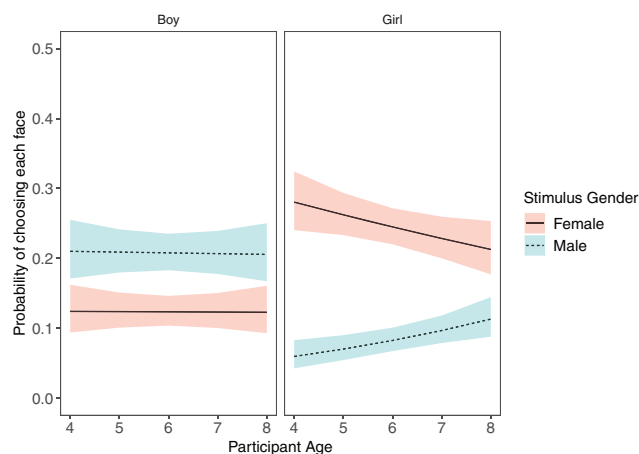


*Note.* Error bars represent 95% confidence intervals (CIs). There were six faces presented on each trial; the dotted horizontal line represents chance responding for each face. When a stimulus was female, for example, this increased the probability that girls would choose it to represent people and decreased the probability that boys would do so. See the online article for the color version of this figure.

men), thus, suggesting that children view Black women, specifically, as less typical of their gender categories. This different pattern of findings may reflect task differences across studies, a possibility we return to in the General Discussion.

**Figure 3**

*Children's Predicted Probability of Picking a Particular Face as the Best Representation for the People Category as a Function of Stimulus Gender and Participant Age*

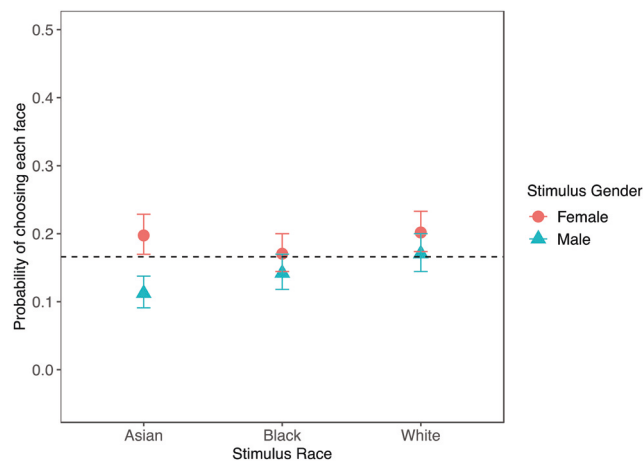


*Note.* Panels are separated by participant gender. Error bars represent 95% confidence intervals (CIs). There were six faces presented on each trial. As shown, boys were more likely to select a stimulus if it was male, in a consistent manner across age. Girls were similarly more likely to select a stimulus if it was female, but this tendency declined across age. See the online article for the color version of this figure.

Study 2 was designed to further probe our Study 1 findings in several ways. First, we expanded our stimuli to include categories of children—that is, in addition to studying representations of *people*, *men*, and *women*, we probed representations of *kids*, *boys*, and

**Figure 4**

*Children's Predicted Probability of Picking a Particular Face as the Best Representation for the People Category as a Function of Stimulus Gender and Stimulus Race*



*Note.* Error bars represent 95% confidence intervals (CIs). There were six faces shown per trial; the dotted horizontal line represents chance responding. As shown, when an Asian face was female, this increased the probability that children would choose it to represent a person relative to an Asian male face. See the online article for the color version of this figure.

girls. We added these categories because much prior work on the development of social categorization has examined how children think about same-age peers (e.g., Shutts et al., 2013) and because children acquire the labels “girl” and “boy” before the labels “man” and “woman” (they also acquire man before woman; Zosuls et al., 2009). Thus, we anticipated that including these categories may help connect the present findings to the broader developmental literature, as well as test the possibility that children may integrate gender and race information into their categories of same-age peers in a different manner than they do for representations of adult categories. We also included a labeling task to explore how children’s use of category labels might relate to their category knowledge and prototypes.

Second, we varied the affective expressions of the stimuli in Study 2. Because neutral (i.e., nonsmiling) faces can appear counterstereotypical for women more so than men (e.g., Birnbaum et al., 1980), we considered that showing only people with neutral expressions in Study 1 may have interfered with our detection of children’s prototypes for the category of *women*. To evaluate this possibility, and to more generally explore how affective information might interact with race and gender in children’s representations (Cooley et al., 2018; Roberts et al., 2017), in Study 2 we varied whether children saw stimuli with neutral or smiling faces across participants.

Third, we considered the role of processes based on group membership in more detail by recruiting a larger and more diverse sample of children. To facilitate the examination of the different strategies that children could use to select prototypes across trials, we implemented Bayesian models to compare the predicted patterns of behavior derived from group-based processes, intersectional invisibility theory, gendered-race theory, and combinations of these strategies across trials. The inclusion of these Bayesian analyses served to provide a more comprehensive understanding of the relative importance of stimulus characteristics (i.e., stimulus race, stimulus gender), participant characteristics (e.g., participant gender, participant race), and the interaction of the two.

## Study 2

### Method

We preregistered all hypotheses and methodology at: [https://osf.io/s7gm8/?view\\_only=4e68ee22517844468a07707e501a7de1](https://osf.io/s7gm8/?view_only=4e68ee22517844468a07707e501a7de1). Materials are located in the same OSF repository as Study 1. Example videos of our procedure are available to authorized users at <https://nyu.databrary.org/volume/1270>. Deviations from our preregistration are noted at the end of this section.

### Participants

Between June 2019 and March 2020, we recruited 365 children from a children’s museum in New York City and a public elementary school in Brooklyn, NY to participate in the study ( $M_{\text{age}} = 5.81$ ,  $SD = 1.64$ , range = 2.75–9.47; 185 girls [51%] and 180 boys [49%]). In Study 2, we did not restrict our sample by participant race and had a more racially and ethnically diverse sample than Study 1, though our socioeconomic status (SES) diversity was similarly constrained, as in Study 1, by our recruitment sites. We do not have race information for 69 children (19% of the sample).

Among children for whom we do have racial demographics (as reported by parents or guardians), 123 were White (40%), 51 were Asian (17%), 50 were Latinx (16%), 26 were Black (9%), 39 were Multiracial (13%), and 7 were Middle-Eastern (2%). Because we had a diverse sample of participants but very unequal numbers of children from different groups, we did not design the main analyses to test for effects of participant race. Instead, we considered the effects of participant race via a series of Bayesian analyses designed to identify the strategies that children used to select prototypes across trials, including the extent to which these strategies varied by the participant’s own group memberships (these analyses included the subset of children for which information about child race and ethnicity was provided by parents).

We initially calculated that a sample size of 167 participants would provide adequate power ( $1-\beta = .80$ ) to detect a small-to-medium effect size (odds ratio [ $OR$ ] = 2.67; Chen et al., 2010) based on an initial analysis of the interaction between stimulus race and participant age in children’s prototype selection of *men* from Study 1. However, given that we sought to investigate participant gender as an additional moderator, we opted to recruit roughly an additional 50% of the sample (given the increased sample necessary for tests of moderation; Giner-Sorolla, 2018), amounting to a total sample of 240 participants. We ended up with a larger sample than planned, however, due to a later decision to change our exclusion criteria (see Deviations From Preregistration, below).

### Prototype Selection Task

**Warmup Trials.** The prototype task mirrored that of Study 1, wherein children made a book to teach an alien named Feppy about our world. For the warmup trials, we switched the categories from *shapes* and *fruit* to *birds* and *fish*. For the bird trials, children saw pictures of a robin, an ostrich, and a penguin, and heard the following prompt: “Feppy wants to learn about *birds*. Which one would you pick to put in a book to teach Feppy about *birds*?” For the fish trials, children saw a picture of a goldfish, a pufferfish, and a box fish, and heard the same prompt (substituting *fish* for *bird*). This warmup represented a conceptual change from Study 1—rather than only have one response option that fit the category (and prompt responses based on accuracy), now all three response options fit the category, albeit to different degrees. Thus, this warmup more closely approximated a prototypicality task—the process of interest.

**Critical Trials.** Following the warmup trials, children completed a series of critical trials with pictures of people. Unlike Study 1, we included only one trial per category and also incorporated the between-participants condition manipulation of facial expression, wherein children were randomly assigned to view pictures of either smiling or neutral stimuli across all trials (the people in the photographs were the same across conditions).

Children viewed a total of six trials, one for each of the following categories: *people*, *kids*, *men*, *women*, *boys*, and *girls*. For the *kids*, *boys*, and *girls* trials, pictures of children were drawn from the CAFÉ database (LoBue & Thrasher, 2014); adult pictures were a new set of faces relative to Study 1 (Face Research Lab London Set; DeBruine & Jones, 2017) to test whether patterns in Study 1 generalized across adult stimuli. As ratings of masculinity and femininity were not available for these adult faces (as they had been for Study 1), we asked a group of adult participants ( $N =$

30) to rate the masculinity and femininity of the adult stimuli with neutral expressions and found that these ratings did not vary by race or the interaction between race and gender for either masculinity or femininity ( $ps > .40$ ).

The *people* and *kids* trials always came first (in randomized order), followed by the gendered trials of *men*, *women*, *boys*, and *girls* (in randomized order). For the *people* and *kids* trials, children saw a total of six faces, one for each race (Black, White, or Asian)  $\times$  gender (male or female) combination. For the gendered trials, children viewed three pictures that varied only in race (i.e., Black, White, and Asian men, women, boys, or girls, depending on the trial). The order in which the pictures were presented on screen was randomized within trial.

We also probed children's representations using slightly different wording in Study 2. Whereas much previous research on category representations has asked participants to select the "best example" of a category (as in Study 1), it is possible that participants could have misunderstood this prompt as asking them to select the "best" (i.e., most *idealized* category member; for discussion of this possibility, see Kim & Murphy, 2011) rather than the most representative. Thus, on each trial in Study 2, children heard, "Feppy wants to learn about [category]. Which one would you put in a book to teach Feppy about [category]?"

### Labeling Task

Following the prototype selection task, children were told that Feppy did not know what to call many things but wanted to learn. Participants were then shown a series of pictures and asked what they would call the stimuli in the picture. Children saw a total of five critical trials (*adults*, *boys*, *men*, *girls*, *women*), as well as two practice trials (*dogs* and *balls*). Due to an error, we omitted a picture of *kids* from this task. The order of trials was randomized, and children's responses were recorded and then coded by two independent research assistants. For the *adults* trial, research assistants coded whether the child used a male-gendered or female-gendered label (each coded as 1) or a superordinate label (coded as 0). These codes were nonexclusive; if a child said, "mommies and daddies," then this response was scored with a 1 for both male-gendered and female-gendered labels. For all other trials (i.e., the set of four gendered pictures), research assistants coded whether responses contained a superordinate label (e.g., "kids" for a picture of boys) or a gendered label (e.g., "boys" for a picture of boys). Reliability between coders was excellent (99.3% agreement, Cohen's  $\kappa = .99$ ). Disagreements between coders were resolved by the first author. All procedures were approved by the NYU Institutional Review Board (IRB-FY2016-760).

### Analytic Strategy

We used linear mixed models, nesting stimulus within participant and specifying a binomial distribution, and included a random effect for participant. We ran separate linear mixed models for pairs of trials grouped together by stimuli gender (e.g., *men* and *boys* trials were analyzed together). We tested for main and interactive effects of stimuli race, stimuli age-group, stimuli and participant gender (where appropriate) and facial affect in our confirmatory models, and examined moderation by participant age (mean-centered) and use of gendered (vs. superordinate) category labels in exploratory analyses. When testing changes across age, we

report unstandardized beta coefficient values. We again report the results from Type II Wald chi-square tests using the Anova function from the car package in R (Fox et al., 2012). As in Study 1, predicted means reflect the likelihood of picking a given stimulus (i.e., chance levels are 1/3 (33.3%) for gender trials and 1/6 (16.7%) for superordinate trials).

### Deviations From Preregistration

In our preregistration, we planned to exclude participants who failed to respond as predicted on both warmup trials (i.e., by selecting a goldfish to represent *fish* and robin to represent *birds*). In retrospect, however, we realized these criteria were too restrictive (eliminating 98 children, or 27% of the sample) and could introduce bias into our sample. In particular, children may have selected different exemplars than expected on the warmup due to variations in cultural experience with different animals, learning history, or environmental input. In other words, limiting our sample to only those who selected normative exemplars on the warmup trials may have inadvertently biased our sample to those who share a particular cultural frame. Thus, while we expected nearly all children to be able to complete these practice trials with ease, excluding such a large portion of our sample for failing to respond as predicted could have undermined the generalizability of our findings. For interested readers, we include analyses strictly adhering to our preregistered protocol in the online supplemental materials. These analyses yielded the exact same results, with the exception of one higher-order interaction in children's selection of superordinate prototypes. We also opted to analyze our data using chi-square tests instead of specific contrast codes, so as to not constrain the model and the patterns of where differences may occur. Finally, we adjusted some of our Bayesian strategies to reflect more nuanced decisional strategies.

### Results

We first present the confirmatory (preregistered) analyses of gendered category trials in the prototype task (*men*, *women*, *boys*, *girls*), followed by the confirmatory (preregistered) analyses for the superordinate category trials in the prototype task (*people*, *kids*), and finally the confirmatory and exploratory results of the labeling task. Across all analyses, we found very few meaningful effects of facial affect (whether the stimuli showed pictures of people who were smiling or not) and none that altered the interpretation of key findings. Therefore, although facial affect condition was included in all models, we present findings related to this factor in the online supplemental materials in the interest of brevity.

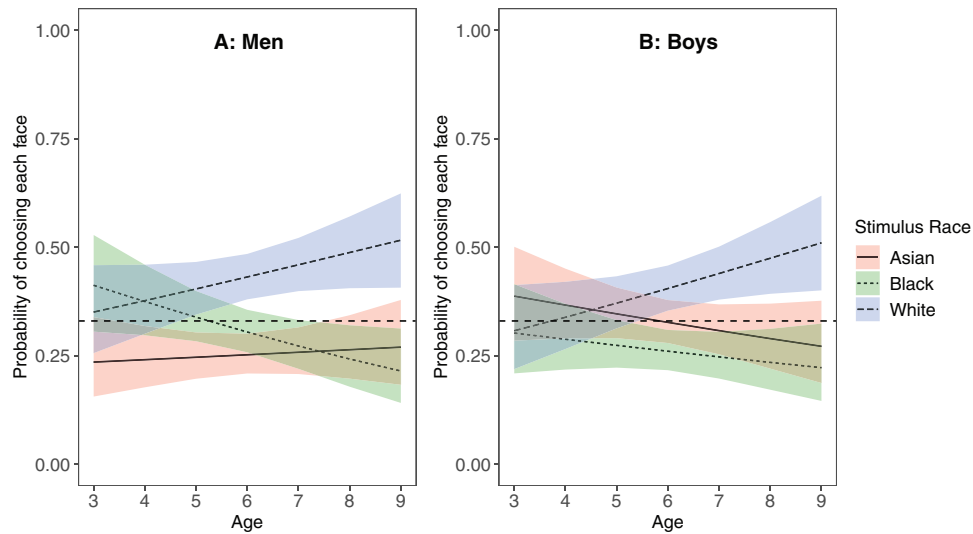
### Prototype Selection Task

**Male-Gendered Trials (Men, Boys).** As in Study 1, children were more likely to choose an exemplar who was White than someone who was Asian or Black to represent the categories of *men* and *boys* (main effect of stimulus race,  $\chi^2 = 34.61$ ,  $df = 2$ ,  $p < .001$ ). Similar to Study 1, this effect strengthened with participant age (stimulus race by participant age interaction,  $\chi^2 = 12.41$ ,  $df = 2$ ,  $p = .002$ ; see Figure 5A and 5B). That is, with age, children became more likely to choose someone White ( $b = .14$ ,  $SE = .05$ ,  $z = 2.57$ ,  $p = .010$ ) and less likely to choose someone Black (a pattern that differed from Study 1,  $b = -.13$ ,  $SE = .06$ ,  $z = -2.08$ ,  $p =$



**Figure 5**

*Children's Predicted Probability of Picking a Particular Face for Male-Gendered Categories as a Function of Stimulus Race and Participant Age for Men (Left Panel; A) and Boy (Right Panel; B) Trials*



*Note.* Error bands represent 95% confidence intervals (CIs). There were three faces shown per trial; the dotted horizontal line represents chance responding. As shown, when a male face was White, this increased the probability that children would choose it to represent men or boys relative to when a male face was Black or Asian. See the online article for the color version of this figure.

.037). Children's selections of Asian exemplars on this task did not change with age ( $b = -.03$ ,  $SE = .06$ ,  $z = -.56$ ,  $p = .58$ ).

**Female-Gendered Trials (Women, Girls).** Unlike Study 1, children's selections of who is most representative of female gender categories varied by stimulus race (main effect of stimulus race;  $\chi^2 = 9.88$ ,  $df = 2$ ,  $p = .007$ ). Stimulus race further interacted with stimulus age-group, such that children picked Asian women most often to represent *women* (see Figure 6A) and White girls most often to represent *girls* (see Figure 6B; interactions between stimulus age and stimulus race,  $\chi^2 = 15.76$ ,  $df = 2$ ,  $p < .001$ ). Although children were relatively unlikely to select Black women or girls to represent these categories overall, they became more likely to do so with age (interaction between stimulus race and participant age,  $\chi^2 = 6.76$ ,  $df = 2$ ,  $p = .034$ ).

**Superordinate Trials (People, Kids).** As in Study 1, children's selections of who is most representative of superordinate categories (*people* and *kids*) were heavily biased in favor of their own gender (interaction between participant gender and stimuli gender,  $\chi^2 = 265.80$ ,  $df = 1$ ,  $p < .001$ ). For boys, this own-gender bias was particularly strong for selections of White male stimuli (three-way interaction with stimulus race:  $\chi^2 = 6.98$ ,  $df = 2$ ,  $p = .030$ , see Figure 7).

Children's prototypes of superordinate categories were also biased by both the race and gender of the stimulus, independent of any own-gender biases (Stimulus Race  $\times$  Stimulus Gender interaction;  $\chi^2 = 8.50$ ,  $df = 2$ ,  $p = .014$ ), such that children were the most likely to pick Asian females relative to all other stimuli presented. This pattern was primarily driven by children's prototype of *people* (vs. *kids*; interaction  $\chi^2 = 14.70$ ,  $df = 2$ ,  $p < .001$ ; see Figure 8).

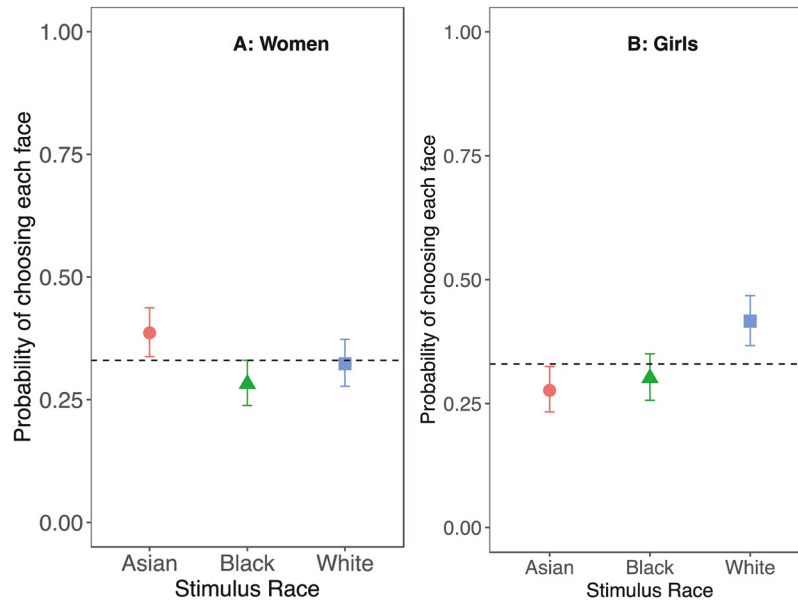
**Bayesian Modeling.** While our analyses thus far capture what children's prototypes of various social categories look like on average, we were also interested in whether children employ consistent

strategies in their use of race and gender when selecting the exemplars they perceive as most representative of social categories at an individual level. These Bayesian analyses also provided a more robust test for the effect of children's own group membership, given that frequentist models may run into issues of low statistical power. To test these questions, we used a Bayesian framework to identify the selection strategies underlying children's responses. For these analyses, we examined only White, Black, and Asian monoracial participants ( $N = 200$ ) given that our group-based strategies would not be applicable for participants whose race did not match one of the three target races used in our stimuli.

For the sake of brevity, we highlight here the key findings from these analyses and direct interested readers to see the online supplemental materials for discussion on how the models were designed and implemented and the full set of analyses. To summarize, the model indicated that children most often selected prototypes that shared their own group memberships, especially gender (see Figure 9). Some children appeared to consider just one of their own group memberships (either gender *or* race; this best characterized the responses of 28% of children); among this group, children were far more likely to select prototypes that matched their gender (23% of children in these analyses were best fit by this strategy) than their race (5% of children in these analyses).

Notably, approximately 51% of children considered both race and gender in their selections across trials; yet, over half of these (28% of children in these analyses) prioritized gender in their selections; that is, these children selected prototypes that matched their gender (but generally not their race) as representative of *people* and *kids*, but they selected prototypes that matched their race when asked to select prototypes of *boys*, *men*, *girls*, and *women* (when only one gender was shown at a time). Another 23% of

**Figure 6**  
*Predicted Probability That Children Will Choose a Particular Face as a Function of Stimulus Race for Women (A, Left) and Girl (B, Right) Trials*



*Note.* For women, children were most likely to select an Asian woman, relative to a Black woman ( $b = -0.47$ ,  $SE = .16$ ,  $z = -2.97$ ,  $p = .003$ ) and marginally more so relative to a White woman ( $b = -0.28$ ,  $SE = .16$ ,  $z = -1.78$ ,  $p = .075$ ), with no difference between the latter two ( $p = .23$ ). For girls, children were more likely to select a White girl than either a Black girl ( $b = -0.50$ ,  $SE = .16$ ,  $z = -3.23$ ,  $p = .001$ ) or an Asian girl ( $b = -0.62$ ,  $SE = .16$ ,  $z = -3.95$ ,  $p < .001$ ), with no difference between the latter two ( $p = .46$ ). Error bars represent 95% confidence intervals (CIs). The horizontal dotted line represents responding at chance. See the online article for the color version of this figure.

children in these analyses appeared to select people who shared both their race and gender whenever possible across trials. Finally, these analyses revealed that children were more likely to select people that matched them in racial group membership with age.

### Labeling Task

**Gendered Stimuli (Confirmatory).** We scored children's knowledge of gender category labels as either present (1) or absent (0). Overall, children were equally knowledgeable of "men" ( $N = 146$ ) and "women" ( $N = 150$ ) category labels,  $t(191) = -.43$ ,  $p = .67$ . As predicted, however, children were more likely to use gendered language for pictures of female stimuli (e.g., referring to *girls* and *women* with those labels, or other gendered synonyms, such as "ladies" or "mommies") than male-gendered stimuli (e.g., they referred to *boys* and *men* less often with those labels, instead more often using more superordinate labels, such as "grown-ups"; Label Type  $\times$  Stimuli Gender interaction,  $\chi^2 = 7.73$ ,  $df = 1$ ,  $p = .005$ ; see Figure 10). There was no higher order interaction with stimulus age-group,  $\chi^2 = .39$ ,  $df = 1$ ,  $p = .53$ .

**Superordinate Stimuli (Exploratory).** We further explored children's use of gendered labels to refer to groups of adults containing both men and women. For these pictures, children were more likely to use male-gendered labels (e.g., "men," "daddies";  $M = .20$ ,  $SD = .40$ ) than female-gendered labels ("women," "mommies,"  $M = .13$ ,  $SD = .34$ ,  $t(336) = -3.27$ ,  $p = .001$ ).

### Prototype Moderation by Label Use (Exploratory)

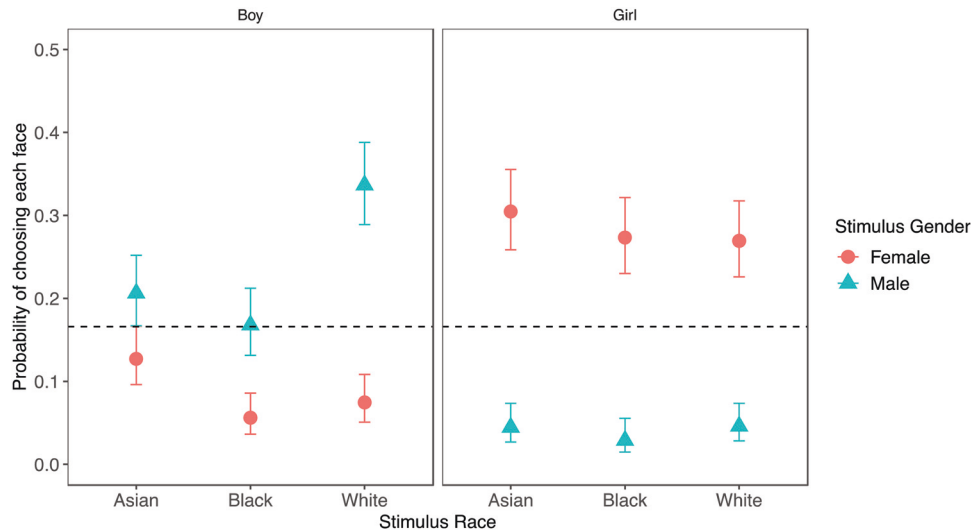
We also explored whether children's propensity to use gendered labels (as a proxy for androcentrism; Bailey et al., 2020) might influence their selections of prototypes, as well as whether this effect strengthens with age. We found only an effect of gendered label usage on children's selection of prototypes of *people*, an effect that emerged with age (four-way interaction,  $\chi^2 = 12.13$ ,  $df = 2$ ,  $p = .002$ ; see Figure 11). That is, children who used a gendered label (e.g., "Mommies and Daddies";  $N = 82$ ) to describe a picture of adults containing both men and women were more likely than children who used a superordinate label (e.g., "grown-ups,"  $N = 255$ ) to pick White men for *people* trials and did so more across age (Age  $\times$  Label Usage interaction,  $\chi^2 = 4.38$ ,  $df = 1$ ,  $p = .036$ ).

### Discussion

In Study 2, we again found that children's prototypes of male categories were biased by race: Children were more likely to select White men as representative of *men*, compared with either Black or Asian men. We also replicated the interaction with participant age observed in Study 1, whereby children were more likely to choose White men as *men* with age. We further demonstrated that this bias toward Whiteness extends to children's representations of

**Figure 7**

*Children's Predicted Probability of Picking a Particular Face as the Best Representation for Superordinate Categories as a Function of Stimulus Gender, Stimulus Race, and Participant Gender (Panels)*



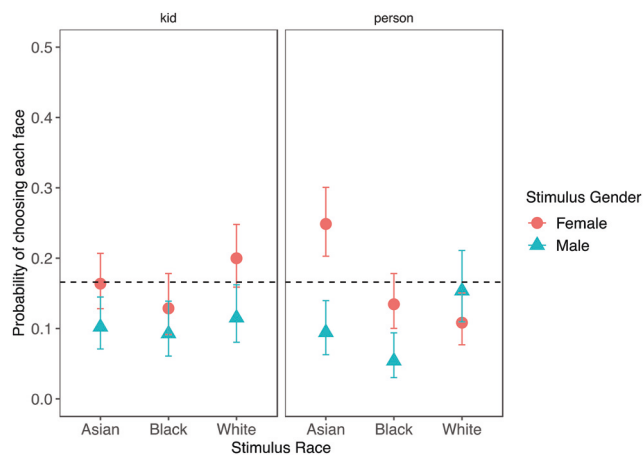
*Note.* Error bars represent 95% confidence intervals (CIs). There were six faces presented on any given trial. Boys' own-gender bias in picking a prototypical person or kid was heightened for the White male stimulus relative to a Black or Asian male stimulus; in contrast, girls' own-gender bias was not significantly moderated by stimulus race. See the online article for the color version of this figure.

boys. Our results lend support to predictions made by intersectional invisibility theory (Purdie-Vaughns & Eibach, 2008), whereby Whiteness serves as the default identity when race is unmentioned.

Children's prototypes of female categories, however, were less consistent. Counter to findings of Study 1, children's representations of female social categories in Study 2 were biased by race. For representations of *women*, children were most likely to choose

**Figure 8**

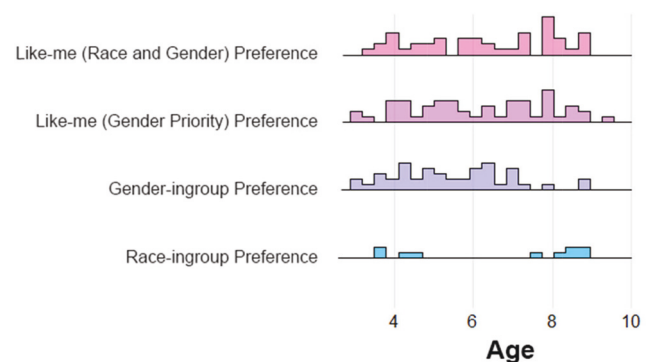
*Children's Predicted Probability of Picking a Particular Face as the Best Representation for the Kid (Left) and Person (Right) Categories as a Function of Stimulus Gender and Stimulus Race*



*Note.* Error bars represent 95% confidence intervals (CIs). There were six faces presented on each trial. When considering a prototypical person, children were more likely to select an Asian female face, relative to all other faces; however, the same was not true when considering the prototypical kid. See the online article for the color version of this figure.

**Figure 9**

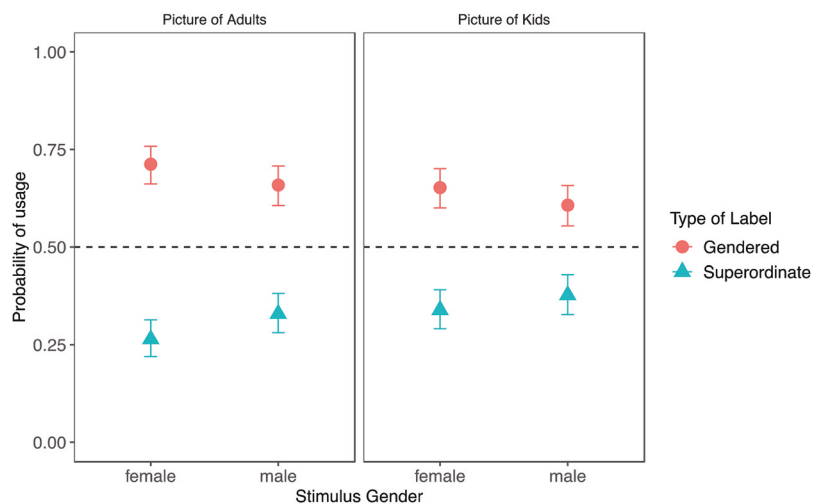
*Top Four Predicted Strategy Across All Six Trials of the Prototype Task as a Function of Participant Age*



*Note.* Bar heights reflect density. Like-me (race and gender) preference indicates children who selected stimuli that matched their own race and gender (when applicable). Like-me (gender priority) preference indicates children who selected stimuli that matched their own gender in the people and kid trials but their own race in trials where gender was constrained. Gender-ingroup and race-ingroup preferences indicate children who selected based on their gender or race, respectively, regardless of the other dimension. For gender-ingroup, this means on the gendered trials, children generally had no specific racial preference. See the online article for the color version of this figure.

**Figure 10**

*Predicted Probability That Children Would Use a Gendered (e.g., “Mommy”) or Superordinate (e.g., “Grownup”) Label as a Function of Stimulus Gender*



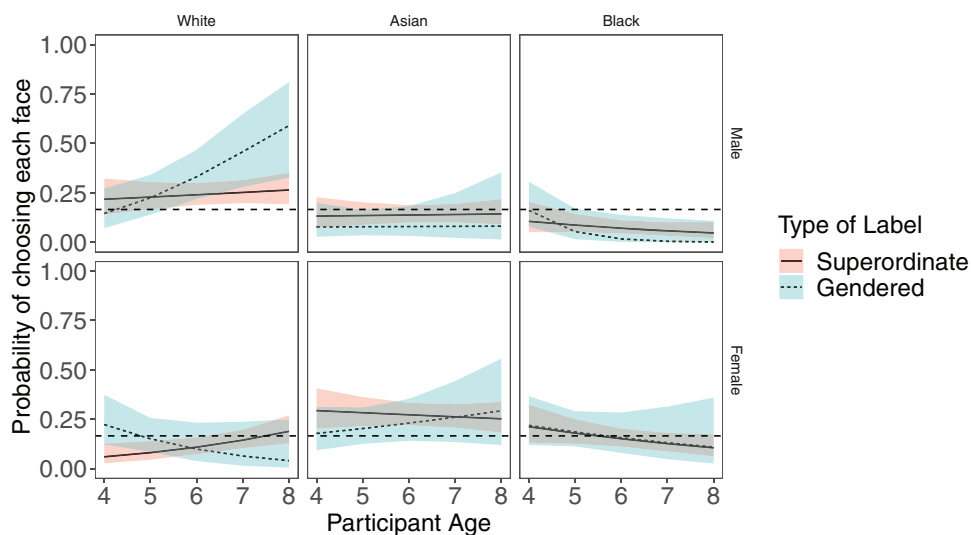
*Note.* Panels are separated by stimulus age-group. Error bars represent 95% confidence intervals. The horizontal dotted line represents equal likelihood of production. See the online article for the color version of this figure.

Asian stimuli, a pattern supporting a gendered race account of social prototypes (Johnson et al., 2012). However, for the *girls* trial, children were most likely to choose White stimuli, supporting an intersectional invisibility account. We found no evidence of moderation by facial affect or category label use. With respect to category label usage, we also found no difference in knowledge of *men* versus *women* category labels. However, this may have been because the labeling task came after the prototype task, where we had already provided children with a category label.

For superordinate social categories (*people* and *kids*), children's representations were primarily (but not exclusively) driven by group membership-based processes, such that children exhibited an own-gender bias in who they perceived as most representative. Extending beyond previous work, however, this own-gender bias was influenced by stimulus race in a manner that reflected children's prototypes of *men* and *women*. That is, boys were most likely to choose White men (the dominant prototype for *men*) as representative of *people*, and girls were most likely to choose Asian

**Figure 11**

*Predicted Probability That Children Would Choose a Particular Face as a Function of Participant Age and Use of Gendered Labels for Describing Pictures of Adults*



*Note.* Error bands represent 95% confidence intervals (CIs). The horizontal dotted line represents chance responding. See the online article for the color version of this figure.



women (the dominant prototype of *women*). We also find evidence for the importance of stimulus age-group—children overall were most likely to choose Asian women as prototypical of *people*, but for the *kids* trial, children favored female stimuli in general but did not select based on race information. Critically, children's female bias for prototypes of superordinate social categories runs counter to predictions that children would express an androcentric bias (i.e., favoring men), but is consistent with the literature on infant face processing (e.g., Quinn et al., 2002).

Our Bayesian analyses build off our trial-based analyses by demonstrating that children prioritize their own gender in deciding who is most representative for superordinate social categories, when they are not constrained in terms of either gender or race, but they come to incorporate race-based information into these representations more with age. However, we note that these results may be underestimating children's use of race in their prototype selections because we assumed a consistent strategy across all trials. It is possible that children chose one strategy for the gender-based trials, and a different strategy for the superordinate category trials.

If children primarily rely on own-gender biases or prioritize female exemplars in forming prototypes of broader social categories, then an open question concerns how and when children transition to exhibiting a male bias in their representations of *people* (as seen in adults; Bailey et al., 2020; Hamilton, 1991). The results of our exploratory analyses suggest that examining the use of gendered labels (as a rudimentary manifestation of androcentrism; Bailey et al., 2020) may be one mechanism driving this development—that is, a reliance on gendered language to refer to people more broadly may reflect a gender-focused view of the social world, which could lead to the selection of White men specifically as representative of *people*. If this is the case, the early use of gendered labels (when other labels are possible) may have important implications for how children appraise both themselves and others, such as endorsement of gender stereotypes. However, this link between gendered language and rudimentary androcentrism should be better validated before future work builds on it.

## General Discussion

Across two studies, we examined how and when children's social prototypes integrate information about race and gender. Specifically, we asked whether race information biases children's representations of gender categories and how race and gender information interact to shape children's representations of broader social categories. We found consistent evidence that children's representations of male-gendered categories were biased in favor of White men—a finding that supports intersectional invisibility theory (vs. gendered-race theory). This effect increased with age, although it emerged at slightly different ages across studies, perhaps due to differences in prompts across studies (i.e., asking children to pick “the best” in Study 1 but not in Study 2).

Children's prototypes of female-gendered categories were less consistent. In Study 1, we found no evidence that race biased children's prototypes of women, while in Study 2, we did. Children in Study 2 were more likely to pick a White girl as the most prototypical *girl*, seemingly supporting an intersectional invisibility account. However, when considering the social category *women*, children favored Asian women, seemingly supporting a gendered-race theoretical account.

Overall, the trial-based analyses seem to favor an intersectional invisibility theoretical account (vs. gendered-race) for how race biases gender prototypes. In three out of four gender-based trials, children chose the White exemplar, only choosing a non-White exemplar in the *woman* trial. The disconnect between how race biases representations of *girls* and *women* versus *boys* and *men* is interesting and invites additional considerations of how sociocultural forces at multiple levels shape children's prototypes. One possible explanation might be that the overwhelming Whiteness of children's media exposure (e.g., Koss, 2015; Roberts & Rizzo, 2021) influences children's prototypes of gender categories via social learning processes. A more proximal, though not mutually exclusive, explanation for this difference is that children think of *women* and *girls* as more disconnected categories (compared with *men* and *boys*). This disconnect may be due to differences in how children account for social roles in shifting from same-age categories to adult categories. Specifically, children may think that *boys* grow up to be *men* and *dads*, but that *girls* primarily grow up to be *moms* before they are considered *women*. Indeed, part of this disconnect may be due to broader sociocultural influences of media—for instance, children have more examples of male superheroes explicitly labeled *men* (e.g., Spiderman, Batman) than they do female superheroes (Baker & Raney, 2007). A theoretical extension that would be consistent with all these possibilities is that the cultural ideologies of androcentrism and ethnocentrism are mutually reinforcing, thus, linking Whiteness and maleness more tightly than Whiteness and femininity. Future work should investigate these possibilities.

The current findings build upon previous work examining how race might bias children's representations of gender (Lei et al., 2020; Leshin et al., 2021). Although previous work demonstrated that children's representation of women treated Black women as more peripheral category members, this prior work did not identify whether children viewed White or Asian women as more *central* (since that study was designed to assess *atypicality* rather than *prototypicality* directly). The present studies build on this prior work by showing how race shapes children's beliefs about which category members are most central and prototypical, revealing that male categories appear to be biased toward Whiteness, whereas how race shapes female prototypes differs based on the age-group of the prototype.

Although these patterns diverge somewhat from those of Lei et al. (2020) and Leshin et al. (2021), the differences may be the result of methodological, and consequently, conceptual differences across the two studies. Methodologically, the speeded nature of Lei et al. (2020) and Leshin et al. (2021) may have left little time or cognitive capacity for children's own group memberships to exert an influence over their responses. From a theoretical standpoint, there may be a divergence between children's more automatic, implicit social beliefs and their more deliberative, explicit ones. For example, among adults, prototypes of the category *American* showed consensual biases toward White people when they were assessed with implicit measures, but more variability as a function of various conscious motivations (e.g., egalitarianism) when they were assessed with more explicit measures (e.g., Devos & Banaji, 2005; Yogeeswaran & Dasgupta, 2010).

Critically, this work is the first, to our knowledge, to examine how children may account for both race and gender in their representations of broader social categories like *people*. Across both

studies, children projected their gender ingroup as the prototype of broader social categories. The strength of this own-gender bias varied to some extent based on the additional factors of participant age, stimulus facial affect, and stimulus race, but none of these additional factors fundamentally altered the core finding of a strong own-gender bias. One important implication of these findings is that who children think of as representing these broader social categories is likely to both reflect and reinforce cultural ideologies that center Whiteness and maleness (Collins, 2002; Lei & Rhodes, 2021; Roberts & Rizzo, 2021; Way et al., 2018). Thus, if boys see their own gender as representative of humanity in general, but girls increasingly do not, then this could have wide-ranging implications for who broader society sees as capable of inhabiting different traits, roles, and behaviors.

The notion that gender exerts a particularly strong influence in shaping children's social representations (relative to race), especially at earlier ages, was also supported by the results from the Bayesian modeling. That is, younger children more often selected prototypes based on gender and integrated race information more with age. This perspective coheres with recent arguments that gender provides a fundamental framework by which humans perceive the social world (Martin & Slepian, 2021). Yet, although younger children did not show strong biases to select exemplars that matched their own race, they did incorporate race information into their social prototypes to some extent. In particular, children appeared to have a pro-White bias for their same-age gender categories (i.e., Boys and girls); one potential consequence of this tendency is that children are more likely to learn gender stereotypes via comparison to White prototypes (Ghavami & Peplau, 2013). Thus, beliefs about racial minority groups may always develop vis-à-vis White exemplars—resulting in perceptions of Black people as more masculine and Asian people as more feminine than White people (e.g., Galinsky et al., 2013).

More broadly, the current findings suggest that multiple processes lead to adults' tendency to treat White men as prototypical, and perhaps further, the overrepresentation of White men in positions of power in society. For one, the tendency to view a White man as the prototypical *man* appears to develop across early to middle childhood (at least in the context we sampled from in the present research). For another, whereas boys think of people of their own gender as more prototypical of *people*, we found some mixed evidence that girls' tendency to think of their own gender in this way declines with age. This is consistent with recent work showing that boys continue to use male (versus female) names in stories they write, even as girls move toward a more balanced distribution of male versus female names over the period of middle to late childhood (Hsiao et al., 2021).

This latter finding also showcases the influence of broader cultural forces, as most children's media centers maleness and Whiteness (e.g., Rizzo et al., 2019). Children are likely forming and developing their prototypes from multiple sources, including who they are exposed to in their immediate social contexts, what media they are consuming, and a range of other culturally situated factors. Although we did not find evidence of significant variation by the participants' own racial backgrounds in the present studies, this may be because participants in these studies are growing up embedded in broader cultural contexts that center Whiteness. Moreover, there may not have been much variation in the social *roles* that children observed, which may contribute to the racial representation differences we observe here. Future

work should consider how various particular sociocultural forces and aspects of children's experiences and environments interact to shape the development of children's social prototypes.

Methodologically, these results have clear implications for how researchers design studies that ask how children use and think about gender as a social category. That is, while extensive research has examined the development of gender beliefs, this body of research often uses stimuli that are entirely White (Rizzo et al., 2019). Given the prevalence of this practice, it is unclear whether the body of work on gender beliefs to date reflects our knowledge of how children think about boys and girls, or only how they think about White boys and White girls. One clear example of this disconnect can be found in children's gendered beliefs about brilliance. Between 5- and 6-years-old, girls showed a decline in the belief that their own gender was "brilliant" when shown White men and women (Bian et al., 2017), but not when comparing Black men and women (Jaxon et al., 2019).

There are number of important limitations to keep in mind with respect to the current findings that limit generalizability. For one, we used a limited stimulus set in each of our studies, which leaves open the question of to what extent children might have focused on features of the specific exemplars to make their decisions. Although we used different image databases across studies and tested for some idiosyncratic features (i.e., smiling, in Study 2), it will nonetheless be important to replicate results using a wider variety of stimuli to ensure that these findings reflect children's categorical representations (and not features of these particular exemplars). Additionally, some faces had teeth shown when smiling while others had closed-mouth smiles. Although smiling in general did not seem to moderate our results (see online supplemental materials for details), it is possible that a smile showing teeth may communicate cultural values that indicate specific contexts and who is most prototypical in that context (Khalid & Quiñonez, 2015).

Another important limitation is that the current work was conducted only within a U.S. context (and in a single city). The United States is unique in terms of both the size and number of racial groups, which make it a distinct context to consider how children may incorporate race and gender in their social prototypes. Nonetheless, many of the core findings may generalize across cultures. Specifically, we would predict that children's representations of gender categories would be biased toward advantaged racial/ethnic groups within a given cultural context, and that their representations of superordinate categories would exhibit an own-gender bias that begins to account for race over the period of early-to-middle childhood. However, other results may differ across cultures, such as the moderating roles of participant race, participant age, gendered language, or effects that stem from particular cultural stereotypes (e.g., those found here that were consistent with gendered-race theory). Thus, future cross-cultural work in this area is clearly warranted.

The lack of socioeconomic diversity within our sample also imposes some important limitations on interpretation. Because children's lives are largely structured by their parents, who in turn tend to have homogenous social networks along multiple identity dimensions (McPherson et al., 2001), children from advantaged backgrounds (e.g., White, upper-middle class) may be less likely to see both socioeconomic and racial diversity around them. Psychologically, children from these advantaged backgrounds may be constructing their sense of the social world by relying on their own group memberships as default categories and define marginalized groups and identities in

contrast to those defaults. Moreover, homogenous social networks also minimize opportunities for White, higher-SES children to engage in intergroup contact, which may have important implications for how children construct their social prototypes. Indeed, previous work by Lei and colleagues (Lei et al., 2020) suggests that the more Black friends a child has in their social network, the faster they were at recognizing White, Black, and Asian people as members of their gender category. Future work should consider how children's backgrounds interact with the frequency and quality of intergroup contact to shape their social prototypes.

### Research in Context

Together, this work reaffirms the call by Black feminist scholars (Cole, 2009; Crenshaw, 1989; Purdie-Vaughns & Eibach, 2008) to fundamentally reexamine who is considered central and representative when researching issues of race and gender. In doing so, we bridge legal studies, social psychology, and developmental psychology (Lei & Rhodes, 2021) to better understand how people develop default representations of social prototypes that are systematically biased by race and gender. By understanding what and how gendered-race prototypes develop, we take a crucial first step in considering how to disrupt these prototypes from strengthening over a person's lifetime and contributing to the creation and reinforcement of systems of inequality.

### References

- American Council on Education. (2017). American College President Study 2017. <https://www.aceacps.org/summary-profile-dashboard/>
- Anglin, G. J. (1986). Prose-relevant pictures and older learners' recall of written prose. *ECTJ*, 34(3), 131–136. <https://doi.org/10.1007/BF02768421>
- Anzures, G., Quinn, P. C., Pascalis, O., Slater, A. M., & Lee, K. (2013). Development of own-race biases. *Visual Cognition*, 21(9-10), 1165–1182. <https://doi.org/10.1080/13506285.2013.821428>
- Arteche, A., Bandeira, D., & Hutz, C. S. (2010). Draw-a-Person test: The sex of the first-drawn figure revisited. *The Arts in Psychotherapy*, 37(1), 65–69. <https://doi.org/10.1016/j.aip.2009.09.002>
- Bailey, A. H., LaFrance, M., & Dovidio, J. F. (2019). Is man the measure of all things? A social cognitive account of androcentrism. *Personality and Social Psychology Review*, 23(4), 307–331. <https://doi.org/10.1177/1088868318782848>
- Bailey, A. H., LaFrance, M., & Dovidio, J. F. (2020). Implicit androcentrism: Men are human, women are gendered. *Journal of Experimental Social Psychology*, 89, 103980. <https://doi.org/10.1016/j.jesp.2020.103980>
- Baker, K., & Raney, A. A. (2007). Equally super?: Gender-role stereotyping of superheroes in children's animated programs. *Mass Communication & Society*, 10(1), 25–41. <https://doi.org/10.1080/15205430709337003>
- Bertrand, M., Chugh, D., & Mullainathan, S. (2005). Implicit discrimination. *The American Economic Review*, 95(2), 94–98. <https://doi.org/10.1257/000282805774670365>
- Bian, L., Leslie, S. J., & Cimpian, A. (2017). Gender stereotypes about intellectual ability emerge early and influence children's interests. *Science*, 355(6323), 389–391. <https://doi.org/10.1126/science.aah6524>
- Birnbaum, D. W., Nosanchuk, T. A., & Croll, W. L. (1980). Children's stereotypes about sex differences in emotionality. *Sex Roles*, 6(3), 435–443. <https://doi.org/10.1007/BF00287363>
- Brewer, M. B., Dull, V., & Lui, L. (1981). Perceptions of the elderly: Stereotypes as prototypes. *Journal of Personality and Social Psychology*, 41(4), 656–670
- Chen, H., Cohen, P., & Chen, S. (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communications in Statistics. Simulation and Computation*, 39(4), 860–864. <https://doi.org/10.1080/03610911003650383>
- Cole, E. R. (2009). Intersectionality and research in psychology. *American Psychologist*, 64(3), 170–180. <https://doi.org/10.1037/a0014564>
- Collins, P. H. (2002). *Black feminist thought: Knowledge, consciousness, and the politics of empowerment*. Routledge. <https://doi.org/10.4324/9780203900055>
- Cooley, E., Winslow, H., Vojt, A., Shein, J., & Ho, J. (2018). Bias at the intersection of identity: Conflicting social stereotypes of gender and race augment the perceived femininity and interpersonal warmth of smiling Black women. *Journal of Experimental Social Psychology*, 74, 43–49. <https://doi.org/10.1016/j.jesp.2017.08.007>
- Crenshaw, K. (1989). *Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics*. University of Chicago Legal Forum. <https://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8>
- DeBruine, L. M., & Jones, B. C. (2017). *Face Research Lab London Set* Figshare. <https://doi.org/10.6084/m9.figshare.5047666>
- Devos, T., & Banaji, M. R. (2005). American = White? *Journal of Personality and Social Psychology*, 88(3), 447–466. <https://doi.org/10.1037/0022-3514.88.3.447>
- Dulin-Keita, A., Hannon Iii, L., Fernandez, J. R., & Cockerham, W. C. (2011). The defining moment: Children's conceptualization of race and experiences with racial discrimination. *Ethnic and Racial Studies*, 34(4), 662–682.
- Foster-Hanson, E., & Rhodes, M. (2019). Is the most representative skunk the average or the stinkiest? Developmental changes in representations of biological categories. *Cognitive Psychology*, 110, 1–15. <https://doi.org/10.1016/j.cogpsych.2018.12.004>
- Fox, J., Weisberg, S., Adler, D., Bates, D., Baud-Bovy, G., Ellison, S., & Heiberger, R. (2012). *Package 'car'*. R Foundation for Statistical Computing.
- Galinsky, A. D., Hall, E. V., & Cuddy, A. J. (2013). Gendered races: Implications for interracial marriage, leadership selection, and athletic participation. *Psychological Science*, 24(4), 498–506. <https://doi.org/10.1177/0956797612457783>
- Ghavami, N., & Peplau, L. A. (2013). An intersectional analysis of gender and ethnic stereotypes: Testing three hypotheses. *Psychology of Women Quarterly*, 37(1), 113–127. <https://doi.org/10.1177/0361684312464203>
- Giner-Sorolla, R. (2018). Powering your interaction. Approaching significance blog [Internet]. <https://approachingblog.wordpress.com/2018/01/24/powering-your-interaction-2/>
- Greenlee, J. S., Bos, A. L., Holman, M. R., Lay, J. C., & Oxley, Z. M. (2020). Drawing Madam President. In I. Cargile, D. Davis, J. Merolla, & R. VanSicke-Ward (Eds.), *The Hillary Effect: Perspectives on Clinton's Legacy* (pp. 125–128). Bloomsbury Publishing.
- Hamilton, M. C. (1991). Masculine bias in the attribution of personhood: People = male, male = people. *Psychology of Women Quarterly*, 15(3), 393–402. <https://doi.org/10.1111/j.1471-6402.1991.tb00415.x>
- Hegarty, P. (2017). On the failure to notice that White people are White: Generating and testing hypotheses in the celebrity guessing game. *Journal of Experimental Psychology: General*, 146(1), 41–62. <https://doi.org/10.1037/xge0000243>
- Houston, A. N., & Terwilliger, R. (1995). Sex, sex roles, and sexual attitudes: Figure gender in the Draw-A-Person test revisited. *Journal of Personality Assessment*, 65(2), 343–357. [https://doi.org/10.1207/s15327752jpa6502\\_9](https://doi.org/10.1207/s15327752jpa6502_9)
- Hsiao, Y., Banerji, N., & Nation, K. (2021). Boys write about boys: Androcentrism in children's reading experience and its emergence in children's own writing. *Child Development*, 92(6), 2194–2204. <https://doi.org/10.1111/cdev.13623>
- Imhoff, R., Dotsch, R., Bianchi, M., Banse, R., & Wigboldus, D. H. (2011). Facing Europe: Visualizing spontaneous in-group projection. *Psychological Science*, 22(12), 1583–1590. <https://doi.org/10.1177/0956797611419675>
- Jaxon, J., Lei, R. F., Shachnai, R., Chestnut, E. K., & Cimpian, A. (2019). The acquisition of gender stereotypes about intellectual ability:



- Intersections with race. *Journal of Social Issues*, 75(4), 1192–1215. <https://doi.org/10.1111/josi.12352>
- Johnson, K. L., Freeman, J. B., & Pauker, K. (2012). Race is gendered: How covarying phenotypes and stereotypes bias sex categorization. *Journal of Personality and Social Psychology*, 102(1), 116–131. <https://doi.org/10.1037/a0025335>
- Jones, S. (2017, June 9). *White men account for 72% of corporate leadership at 16 of the Fortune 500 Companies*. Fortune. <https://fortune.com/2017/06/09/white-men-senior-executives-fortune-500-companies-diversity-data/>
- Khalid, A., & Quiñonez, C. (2015). Straight, white teeth as a social prerogative. *Sociology of Health & Illness*, 37(5), 782–796. <https://doi.org/10.1111/1467-9566.12238>
- Kim, S., & Murphy, G. L. (2011). Ideals and category typicality. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 37(5), 1092–1112. <https://doi.org/10.1037/a0023916>
- Kinzler, K. D., & Dautel, J. B. (2012). Children's essentialist reasoning about language and race. *Developmental Science*, 15(1), 131–138. <https://doi.org/10.1111/j.1467-7687.2011.01101.x>
- Koss, M. D. (2015). Diversity in contemporary picturebooks: A content analysis. *Journal of Children's Literature*, 41(1), 32–42.
- Leshin, R. A., Lei, R. F., Byrne, M., & Rhodes, M. (2021). Who is a typical woman? Exploring variation in how race biases representations of gender across development. *Developmental Science*. Advance online publication. <https://doi.org/10.1111/desc.13175>
- Lei, R. F., & Rhodes, M. (2021). Why developmental research on social categorization needs intersectionality. *Child Development Perspectives*, 15(3), 143–147. <https://doi.org/10.1111/cdep.12421>
- Lei, R. F., Leshin, R. A., & Rhodes, M. (2020). The development of intersectional social prototypes. *Psychological Science*, 31, 911–926. <https://doi.org/10.1177/0956797620920360>
- Livingston, R. W., Rosette, A. S., & Washington, E. F. (2012). Can an agentic Black woman get ahead? The impact of race and interpersonal dominance on perceptions of female leaders. *Psychological Science*, 23(4), 354–358.
- LoBue, V., & Thrasher, C. (2014). The Child Affective Facial Expression (CAFE) set: Validity and reliability from untrained adults. *Frontiers in Psychology*, 5, 1532. <https://doi.org/10.3389/fpsyg.2014.01532>
- Ma, D. S., Correll, J., & Wittenbrink, B. (2015). The Chicago face database: A free stimulus set of faces and norming data. *Behavior Research Methods*, 47(4), 1122–1135. <https://doi.org/10.3758/s13428-014-0532-5>
- Maccoby, E. E. (1988). Gender as a social category. *Developmental Psychology*, 24(6), 755–765. <https://doi.org/10.1037/0012-1649.24.6.755>
- Mandalaywala, T. M., Ranger-Murdock, G., Amodio, D. M., & Rhodes, M. (2019). The nature and consequences of essentialist beliefs about race in early childhood. *Child Development*, 90(4), e437–e453.
- Martin, A. E., & Slepian, M. L. (2021). The primacy of gender: Gendered cognition underlies the big two dimensions of social cognition. *Perspectives on Psychological Science*, 16(6), 1143–1158. <https://doi.org/10.1177/1745691620904961>
- Martin, C. L., & Ruble, D. (2004). Children's search for gender cues: Cognitive perspectives on gender development. *Current Directions in Psychological Science*, 13(2), 67–70. <https://doi.org/10.1111/j.0963-7214.2004.00276.x>
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27(1), 415–444.
- Mervis, C. B., & Pani, J. R. (1980). Acquisition of basic object categories. *Cognitive Psychology*, 12(4), 496–522. [https://doi.org/10.1016/0010-0285\(80\)90018-3](https://doi.org/10.1016/0010-0285(80)90018-3)
- Okimoto, T. G., & Brescoll, V. L. (2010). The price of power: Power seeking and backlash against female politicians. *Personality and Social Psychology Bulletin*, 36(7), 923–936. <https://doi.org/10.1177/0146167210371949>
- Open Science Framework. (2021). *Children's social prototypes*. <https://osf.io/qfceb/>
- Pauker, K., Ambady, N., & Apfelbaum, E. P. (2010). Race salience and essentialist thinking in racial stereotype development. *Child Development*, 81(6), 1799–1813.
- Perszyk, D. R., Lei, R. F., Bodenhausen, G. V., Richeson, J. A., & Waxman, S. R. (2019). Bias at the intersection of race and gender: Evidence from preschool-aged children. *Developmental Science*, 22(3), e12788. <https://doi.org/10.1111/desc.12788>
- Purdie-Vaughns, V., & Eibach, R. P. (2008). Intersectional invisibility: The distinctive advantages and disadvantages of multiple subordinate-group identities. *Sex Roles*, 59(5–6), 377–391. <https://doi.org/10.1007/s11199-008-9424-4>
- Quinn, P. C., Yahr, J., Kuhn, A., Slater, A. M., & Pascalis, O. (2002). Representation of the gender of human faces by infants: A preference for female. *Perception*, 31(9), 1109–1121. <https://doi.org/10.1068/p3331>
- Rhodes, M., Brickman, D., & Gelman, S. A. (2008). Sample diversity and premise typicality in inductive reasoning: Evidence for developmental change. *Cognition*, 108(2), 543–556. <https://doi.org/10.1016/j.cognition.2008.03.002>
- Rhodes, M., & Gelman, S. A. (2009). A developmental examination of the conceptual structure of animal, artifact, and human social categories across two cultural contexts. *Cognitive Psychology*, 59(3), 244–274. <https://doi.org/10.1016/j.cogpsych.2009.05.001>
- Rizzo, M. T., Green, E., Dunham, Y., Bruneau, E., & Rhodes, M. (2019). *The development of racial bias: Parental and media influences [Poster presentation]*. *Cognitive Development Society*, Louisville, KY.
- Roberts, S. O., & Gelman, S. (2017). Multiracial children's and adults' categorizations of multiracial individuals. *Journal of Cognition and Development*, 18(1), 1–15. <https://doi.org/10.1080/15248372.2015.1086772>
- Roberts, S. O., Leonard, K. C., Ho, A. K., & Gelman, S. A. (2017). Does this smile make me look White? Exploring the effects of emotional expressions on the categorization of multiracial children. *Journal of Cognition and Culture*, 17(3–4), 218–231. <https://doi.org/10.1163/15685373-12340005>
- Roberts, S. O., & Rizzo, M. T. (2021). The psychology of American racism. *American Psychologist*, 76(3), 475–487. <https://doi.org/10.1037/amp0000642>
- Rosch, E. H. (1973). On the internal structure of perceptual and semantic categories. In T. E. Moore (Ed.), *Cognitive development and acquisition of language* (pp. 111–144). Academic Press. <https://doi.org/10.1016/B978-0-12-505850-6.50010-4>
- Rosch, E., & Mervis, C. B. (1975). Family resemblances: Studies in the internal structure of categories. *Cognitive Psychology*, 7(4), 573–605. [https://doi.org/10.1016/0010-0285\(75\)90024-9](https://doi.org/10.1016/0010-0285(75)90024-9)
- Rosch, E., Simpson, C., & Miller, R. S. (1976). Structural bases of typicality effects. *Journal of Experimental Psychology: Human Perception and Performance*, 2(4), 491–502. <https://doi.org/10.1037/0096-1523.2.4.491>
- Rosette, A. S., Leonardelli, G. J., & Phillips, K. W. (2008). The White standard: Racial bias in leader categorization. *Journal of Applied Psychology*, 93(4), 758–777. <https://doi.org/10.1037/0021-9010.93.4.758>
- Shutts, K. (2015). Children's social category-based giving and its correlates: expectations and preferences. *Developmental Psychology*, 51(4), 533–543.
- Shutts, K., Banaji, M. R., & Spelke, E. S. (2010). Social categories guide young children's preferences for novel objects. *Developmental Science*, 13(4), 599–610. <https://doi.org/10.1111/j.1467-7687.2009.00913.x>
- Shutts, K., Pemberton, C. K., & Spelke, E. S. (2013). Children's use of social categories in thinking about people and social relationships. *Journal of Cognition and Development*, 14(1), 35–62. <https://doi.org/10.1080/15248372.2011.638686>
- Waxman, S. R. (2010). Names will never hurt me? Naming and the development of racial and gender categories in preschool-aged children. *European Journal of Social Psychology*, 40(4), 593–610. <https://doi.org/10.1002/ejsp.732>
- Way, N., Ali, A., Gilligan, C., & Noguera, P. (Eds.). (2018). *The crisis of connection: Roots, consequences, and solutions*. NYU Press.
- Wenzel, M. (2001). A social categorization approach to distributive justice: Social identity as the link between relevance of inputs and need for



- justice. *British Journal of Social Psychology*, 40(Pt. 3), 315–335. <https://doi.org/10.1348/014466601164858>
- Wenzel, M., Mummendey, A., & Waldzus, S. (2008). Superordinate identities and intergroup conflict: The ingroup projection model. *European Review of Social Psychology*, 18(1), 331–372.
- Westfall, J., Kenny, D. A., & Judd, C. M. (2014). Statistical power and optimal design in experiments in which samples of participants respond to samples of stimuli. *Journal of Experimental Psychology: General*, 143(5), 2020–2045. <https://doi.org/10.1037/xge0000014>
- Wright, D. B., & Sladden, B. (2003). An own gender bias and the importance of hair in face recognition. *Acta Psychologica*, 114(1), 101–114. [https://doi.org/10.1016/S0001-6918\(03\)00052-0](https://doi.org/10.1016/S0001-6918(03)00052-0)
- Yogeeswaran, K., & Dasgupta, N. (2010). Will the “real” American please stand up? The effect of implicit national prototypes on discriminatory behavior and judgments. *Personality and Social Psychology Bulletin*, 36(10), 1332–1345. <https://doi.org/10.1177/0146167210380928>
- Zosuls, K. M., Ruble, D. N., Tamis-LeMonda, C. S., Shrout, P. E., Bornstein, M. H., & Greulich, F. K. (2009). The acquisition of gender labels in infancy: Implications for gender-typed play. *Developmental Psychology*, 45(3), 688–701. <https://doi.org/10.1037/a0014053>

Received June 7, 2021

Revision received October 1, 2021

Accepted November 1, 2021 ■