

Children's Social Preference for Peers Engaged in Brilliance-Required Activities: The Impact of Gender and Race

Vanessa Lazaro and Lin Bian
Department of Psychology, The University of Chicago

Women's underrepresentation in academic fields and professions emphasizing high intellectual talents persists as a prominent societal issue. To explore early antecedents of this gender imbalance, the present study investigated the developmental changes in children's social preference of boys and girls who pursue brilliance-required (vs. effort-required) activities. Importantly, we took an intersectional perspective to explore whether children consider target race in their social preference. Five- to 9-year-old U.S. children ($N = 207$; $M_{\text{age}} = 7.53$; 104 girls and 103 boys; 48% White) were presented with pairs of Asian, Black, and White characters matched in gender. One character was depicted as enjoying a game requiring high intellectual talents and the other enjoyed a game requiring effort. Participants were then asked to choose the character that they liked more, as an indicator of their social preference. With age, children became increasingly likely to prefer White boys and girls of color (i.e., Black and Asian girls) pursuing activities requiring brilliance (vs. activities requiring effort). In contrast, children did not develop increasing social preference for White girls or boys of color who opt in for brilliance-required activities. Our data suggest that, as early as elementary school years, children's social preference in contexts valuing sheer brilliance becomes both gendered and racialized. These findings highlight the importance of using an intersectional approach to identify the specific developmental processes that contribute to social disparities in brilliance-required contexts.

Public Significance Statement

Are boys and girls who opt to pursue activities requiring high intelligence favored by their peers? Five- to 9-year-old children increasingly preferred White boys and girls of color (i.e., Black and Asian girls) engaging in brilliance-focused (vs. effort-focused) activities, but not White girls, Black boys, or Asian boys with similar aspirations. These results shed light on the early roots of social disparities in careers emphasizing brilliance.

Keywords: social preference, brilliance, gender, race, intersectionality

Supplemental materials: <https://doi.org/10.1037/dev0001822.supp>

With increasing globalization, many countries have placed considerable emphasis on scientific innovation. This increased demand for intellectual talent has highlighted the need for more female scientists, yet gender disparities disadvantaging women persist in certain sectors of academia—not just in science, technology, engineering, and mathematics, but also in disciplines within the domain of social sciences and humanities. For example, the gender distribution in computer science and economics is evidently unequal,

with only 25% and 36% of their doctorate recipients being women (National Center for Science and Engineering Statistics, 2022). One shared feature of these disciplines is that their practitioners believe success in their field depends on having “a spark of genius” or brilliance (Leslie et al., 2015; Meyer et al., 2015; Muradoglu et al., 2022). Because men are associated with high intellectual talents (Bennett, 1996; Furnham et al., 2002; Gálvez et al., 2019; Storage et al., 2020), fields and professions emphasizing brilliance may

Koraly Pérez-Edgar served as action editor.

Lin Bian  <https://orcid.org/0000-0001-5438-6736>

The data and R syntax are available at <https://osf.io/q7gbv> (Lazaro & Bian, 2024). This study was supported by the U.S. National Science Foundation CAREER grant (DRL 2145809) awarded to Lin Bian. The authors thank Yihan Qian, Molly Tallberg, Yu-Shan (Grace) Huang, Üli Solovieva, and other members of the EArly Social Thinkers Lab at the University of Chicago for helpful feedback, participant recruitment, and data collection. The authors are grateful to the families and children who participated in this research.

Vanessa Lazaro played a lead role in data curation, investigation, project administration, and visualization, a supporting role in writing—review and editing and an equal role in conceptualization, formal analysis, methodology, and writing—original draft. Lin Bian played a lead role in funding acquisition, resources, supervision, and validation, a supporting role in visualization, and an equal role in conceptualization, formal analysis, investigation, methodology, writing—original draft, and writing—review and editing.

Correspondence concerning this article should be addressed to Lin Bian or Vanessa Lazaro, Department of Psychology, The University of Chicago, 5848 South University Avenue, Chicago, IL 60637, United States. Email: linbian@uchicago.edu or lazaro@uchicago.edu

present a more amicable environment for men than women (Bian, Leslie, & Cimpian, 2018; Bian, Leslie, Murphy, & Cimpian, 2018; Muradoglu et al., 2022; Vial et al., 2022). The present study focused on early antecedents of the gender imbalance in brilliance-required fields. In particular, we investigated the developmental changes in young children's social preference for boys and girls who pursue brilliance-required activities.

In the United States, many hold the cultural stereotype that men possess more raw intellectual talent than women (e.g., Kirkcaldy et al., 2007; Rivera & Tilcsik, 2019; Storage et al., 2020). Given this negative stereotype against women's intelligence, fields and professions valuing brilliance may present barriers to women's participation. Indeed, when professional opportunities (e.g., internship, occupation) were described as requiring intellectual talents, women felt more anxious, less belonged, and ultimately showed lower interest in pursuing these opportunities relative to their male counterparts (Bian, Leslie, Murphy, & Cimpian, 2018; Vial et al., 2022). Moreover, women face greater biases against their competence in brilliance-focused domains such that they were less likely to be referred to a job demanding exceptional intellectual ability compared to men (Bian, Leslie, & Cimpian, 2018).

Emerging developmental work suggests that the psychological processes favoring men over women in brilliance-related domains may operate in early childhood. As early as 6 years old, children internalize the gender stereotype that men and boys possess more intellectual talents than women and girls (Bian et al., 2017; Bian, Leslie, Murphy, & Cimpian, 2018; Jaxon et al., 2019; Shu et al., 2022). When presented with White boys and girls and asked to indicate who is "really, really smart," girls around age 6 became less likely than boys to choose individuals of their own gender (Bian et al., 2017). Once children endorse the gender brilliance stereotype, girls become less interested in activities said as for "really, really smart" children compared to boys (Bian et al., 2017; Kim et al., 2024). In addition, children were less likely to choose girls as teammates to play a game described as for "really, really smart" children compared to a game without this description (Bian, Leslie, & Cimpian, 2018).

The present study expanded this body of literature and explored the social benefits or costs associated with boys and girls engaging in brilliance-required domains. Children were presented with pairs of child characters matched in gender. One character was depicted as enjoying a game valuing brilliance, and the other enjoyed a game valuing hard work—a characteristic that applies to women and men to a similar extent (Bian, Leslie, Murphy, & Cimpian, 2018; Hentschel et al., 2019) and can serve as a relatively neutral comparison. Children then were asked to choose one character that they liked more, as an indicator of their social preference. Given that the gender brilliance stereotype takes root in early childhood and strengthens across development (Zhao et al., 2022), children may gradually prescribe boys to be highly intelligent and prefer those who pursue activities requiring brilliance; however, they may lessen their preference for girls choosing the same activity since girls are not strongly associated with intellectual talents. Indeed, those who violate gender stereotypes often experience social backlash (Eagly & Karau, 2002; Fisk & Overton, 2019; Killen et al., 2002). Children are unwilling to play with or befriend peers who express nonstereotypical gendered behaviors such as boys wearing dresses and girls playing rough and loud (Blakemore, 2003; Conry-Murray et al., 2015; Kwan et al., 2020). Moreover, peer disapproval toward

those who deviate from their respective gender norms increases as children age (Carter & McCloskey, 1984; Kwan et al., 2020; Nabbijohn et al., 2020). We expect that children with age would show stronger social preference for boys, but not for girls, who choose to participate in activities requiring brilliance (vs. effort).

Importantly, the differential social preference for boys and girls engaged in brilliance-required activities may vary depending on the perceived race of targets. Gender stereotypes and biases are often manifested differently toward people from diverse racial backgrounds (Cole, 2009; Crenshaw, 1989; Lei et al., 2023), such that they often target more strongly at members who are perceived to be more representative of their gender group (Purdie-Vaughns & Eibach, 2008; Vogel et al., 2021). In the United States, because racial minority groups are seen as less prototypical of their respective gender category than White men and women (Ghavami & Peplau, 2013; Johnson et al., 2012), men and women of racial minority groups often experience an ironic benefit that allows them to escape from common gender stereotypes (e.g., Donovan, 2011; Galinsky et al., 2013; Goff et al., 2008; Livingston et al., 2012). Indeed, recent developmental studies have supplied evidence that children's association between men and brilliance applies to White people rather than people of color (Jaxon et al., 2019; Shu et al., 2022). For instance, though 6- to 7-year-old children linked men with brilliance rather than women when evaluating White people, this association was reversed when evaluating Black people: Children associated high intelligence with Black women rather than with Black men (Jaxon et al., 2019). Children were also more likely to choose Asian women as possessing high intellectual capacity than Asian men (Shu et al., 2022). Children's social preference for girls and boys who engage in activities requiring brilliance may reflect these race-related nuances. In particular, children may gradually prefer White boys aspiring for brilliance-required (vs. effort-required) activities, but not necessarily extend their preference to Black or Asian boys who make the same activity choices. Vice versa, children may gradually show lower preference toward White girls, but not Black or Asian girls, who aspire for brilliance-required (vs. effort-required) activities.

The Present Study

The present study investigated the developmental changes in young children's social preference for boys and girls aspiring for brilliance-required (vs. effort-required) activities. Importantly, we explored how target race may moderate peer preference. We examined this question with 5- to 9-year-old children, who begin to assimilate the stereotype attributing brilliance to White men (Bian et al., 2017), demonstrate an increased endorsement of this stereotype across this age range (Zhao et al., 2022), and are sensitive to target race when applying the gender stereotype about brilliance (Jaxon et al., 2019; Shu et al., 2022). Thus, this age window allowed us to depict the developmental trajectory and race-related nuances in children's social preference in brilliance-required contexts.

As noted earlier, children were presented with gender-matched pairs of Asian, Black, and White child characters: one was described as enjoying a game valuing brilliance, and the other enjoyed a game valuing hard work. Children then selected one character that they liked more. We chose this design for a few considerations. While we could have presented children with pairs of characters from diverse gender and racial backgrounds, such an approach is likely to exaggerate children's biases by making gender and race highly

salient and trigger children's ingroup favoritism. Instead, we chose to present children with pairs of characters matched in the two dimensions to provide a more stringent test of how children evaluated peers pursuing brilliance-required activities within each group, rather than relative to other gender or racial groups.

Our main hypothesis was two-fold. First, children with age would demonstrate increasing social preference to White boys who play the brilliant game (vs. the hardworking game), but this effect would disappear or even be reversed with respect to White girls. Second, this overall pattern would be reversed with respect to children's social preference about children of color: children would gradually demonstrate a stronger social preference for Black and Asian girls who choose to play the brilliant game (vs. the hardworking game), but not for boys of color.

Method

Transparency and Openness

The data and R syntax are available at <https://osf.io/q7gbv>. The study was not preregistered.

Participants

Participants consisted of 207 U.S.-based children from 5 to 9 years old ($M = 7.53$, $SD = 1.45$; 104 girls and 103 boys). Thirty additional children were tested but excluded from data analyses because of failure to answer both comprehension check questions correctly ($n = 25$, see below), failure to complete the study ($n = 2$), caregiver interference ($n = 2$), or considerable inattention/distraction ($n = 1$).

We performed a priori power analyses based on previous research on children's gender brilliance stereotypes about different racial groups. In particular, past studies found that older children tended to choose White men (vs. White women) as brilliant approximately 60% of the time (Bian et al., 2017), whereas the average choices for Black men (vs. Black women) was 45% (Jaxon et al., 2019). In Shu et al.'s (2022) study, the average proportion of choosing Asian men (vs. Asian women) was 41%. We specified a logistic regression in G*Power 3.1 (Faul et al., 2007), which indicated a sample of 219 participants would provide 80% power to detect children's differential social preference based on target gender and target race. However, the final sample size ended up slightly smaller due to the exclusion of children who did not pass the comprehension check questions. Nonetheless, the size of this sample exceeded those of the studies previously published on similar topics ($Ns = 96$ and 144 in Bian et al., 2017; $N = 145$ in Alto & Mandalaywala, 2023).

Participants were recruited from a university family database. Racial demographic information was available for 99% of participants: Among those, 17.1% identified as Asian, 4.4% as Black/African American, 7.8% as Latinx/Hispanic, 20.5% as multiracial, 48.3% as White, and 2% as another racial group. Primary caregiver's highest level of education was available for 98.5% of participants (5.4% of participants have parents holding a high school diploma, 4.5% associate's degree, 33.7% bachelor's degree, 35.1% master's degree, and 22.3% professional degree). For the 77.1% of participants who provided household income, the median income was \$100,000 (12% lower class, 55.7% middle class, 32% upper class; World Economic

Forum, 2022). The research study was approved by the Institutional Review Board at the University of Chicago.

Procedure

Children participated in one-on-one testing sessions with a trained experimenter over Zoom. Parents completed an online consent form prior to the testing session, and children provided verbal assent. Next, the experimenter asked the parent to refrain from interrupting during the study, shared their screen, recorded the sessions, and entered children's responses in a Qualtrics survey.

Participants were first introduced to two different, novel games (game images and names were drawn from the Novel Object and Unusual Name database; Horst & Hout, 2016). For each game, the experimenter showed children a picture of the game and briefly described how to play it. Crucially, one game was described as for "children who are really, really smart" (i.e., brilliant game) and the other game was for "children who try really, really hard" (i.e., hardworking game; see Supplemental Table S1 for full descriptions). After each game description, participants answered comprehension questions (i.e., "Who did I say can be good at this game?") to ensure that they understood only smart or hardworking children could play either game. If participants provided an incorrect answer, the experimenter repeated the essential requirements of the game (e.g., "Actually, only smart children can be good at this game."). Participants who did not answer both questions correctly were excluded from data analysis ($n = 25$). The number of participants excluded were comparable to past studies on similar topics (Kim et al., 2024, excluded 20 children). Notably, the main finding remained consistent when analyses were conducted with the sample including exclusions (see Supplemental Material for more detail). The order in which either game was presented, and which game was described as for really smart children were counterbalanced.

Next, participants received six test trials featuring pairs of unfamiliar child characters matched in gender and race. Specifically, children saw a pair of Asian boys, a pair of Asian girls, a pair of Black boys, a pair of Black girls, a pair of White boys, and a pair of White girls in a randomized order. The child pictures were drawn from the Child Affective Facial Expression Set (LoBue & Thrasher, 2015). For each pair, the pictures were matched in age and facial expression. Participants heard that one child liked to play the brilliant game, and the other child liked to play the hardworking game (see Supplemental Figure S1 for sample test trial). Hereinafter, for ease of communication, we refer to the two characters as the brilliant child and the hardworking child, respectively.

In each trial, upon seeing each target child's preferred activity, children were asked, "Who do you like more?" to indicate their social preference. Children received a score of 1 if they selected the brilliant target and 0 otherwise. After the third trial, participants received a reminder of which game was for "really, really smart children" and which game was for "children who try really, really hard."

The study ended with a debriefing in which participants were informed that the novel games were only for pretend, children can be good at any game they choose, and that persistence and hard work were important. Participants and families were thanked for their participation with a \$5 Amazon gift card.

Results

We conducted two sets of analyses to explore children's intersectional social preference. First, we performed a mixed-effects logistic regression model (using the *glmer* function in the *lme4* package in R; R Core Team, 2021) with participant age (continuous in years; mean-centered), target race (i.e., Asian, Black, White; categorical), and target gender (i.e., girl, boy; categorical) as well as their interactions as predictors of participants' social preference for the child choosing the brilliance-required game. Random intercepts were included for participants. For the purpose of simplicity and to reduce the risk of Type I error, we then applied the *car::Anova* function to explore the effects. This model revealed a significant three-way interaction among participant age, target gender, and target race, $\chi^2(2) = 11.06$, $p = .004$ (Figure 1). Supplemental analyses suggest that this three-way interaction held regardless of participant socioeconomic status, race, and gender (see Supplemental Material).

To interpret the three-way interaction, we developed three separate models by target race. Specifically, for each target race, we used the same statistical procedure and performed a mixed-effects logistic regression model predicting children's social preference with participant age, target gender and their interaction as predictors and a random intercept for participants.

White Targets

The model revealed a significant interaction between target gender and participant age, $\chi^2(1) = 4.42$, $p = .035$, suggesting that children with age tended to exhibit differential levels of social preference to White boys and White girls interested in the brilliant versus hardworking game (Figure 1, left). To unpack the interaction, we conducted simple slope tests. This analysis indicated that with

age, children became marginally more likely to prefer the brilliant White boy (vs. the hardworking White boy), $B = 0.20$, $SE = 0.12$, $p = .080$, 95% CI $[-0.025, 0.363]$, $OR = 1.22$. In contrast, children's tendency to choose the brilliant White girl (vs. the hardworking White girl) did not vary by age, $B = -0.12$, $SE = 0.11$, $p = .297$, 95% CI $[-0.293, 0.091]$, $OR = 0.89$.

Black Targets

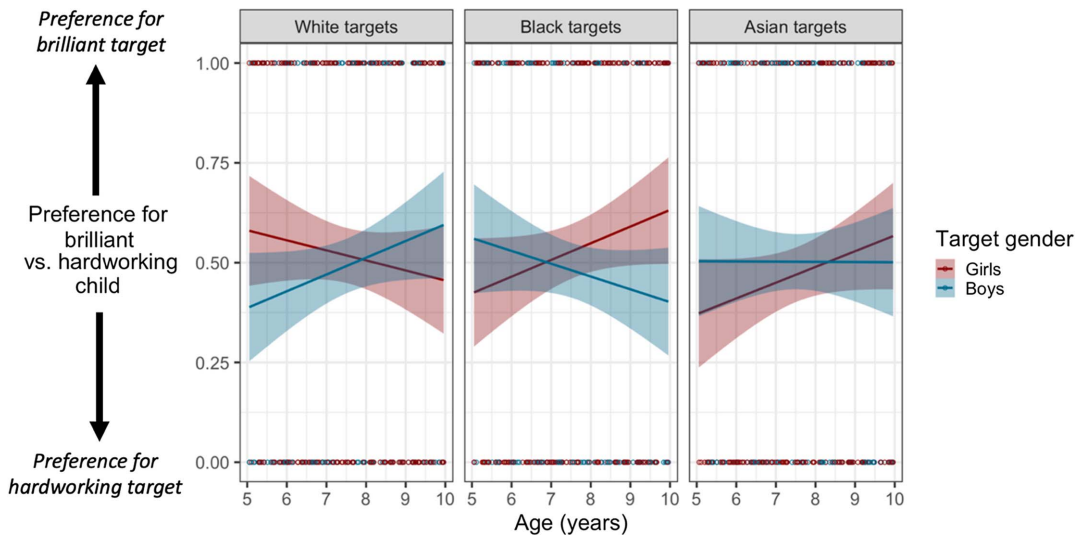
We found a significant interaction between target gender and participant age, $\chi^2(1) = 4.97$, $p = .026$ (Figure 1, middle). The simple slope tests provided suggestive evidence that children with age became more likely to prefer the brilliant Black girl (vs. the hardworking Black girl), $B = 0.19$, $SE = 0.11$, $p = .083$, 95% CI $[-0.025, 0.364]$, $OR = 1.20$. However, children's preference for the brilliant Black boy (vs. the hardworking Black boy) did not change with age, $B = -0.14$, $SE = 0.11$, $p = .187$, 95% CI $[-0.320, 0.062]$, $OR = 0.87$. Note that this pattern was distinctly different from children's social preference when evaluating White peers.

Asian Targets

The model on children's social preference of Asian targets revealed no significant effects: target gender, $\chi^2(1) = 0.42$, $p = .517$; participant age, $\chi^2(1) = 1.22$, $p = .269$; the interaction between target gender and participant age, $\chi^2(1) = 1.45$, $p = .228$ (Figure 1, right). Though the interaction was insignificant, we performed simple slope tests to explore if age was related to children's social preference for Asian girls and boys engaged in brilliance-required (vs. effort required) activities. The analyses yielded nonsignificant results (Asian boys: $B = -0.003$, $SE = 0.10$, $p = .974$, 95% CI $[-0.19, 0.19]$, $OR = 0.997$; Asian girls: $B = 0.17$, $SE = 0.10$, $p = .103$, 95% CI $[-0.03, 0.35]$, $OR = 1.18$). Notably, although these

Figure 1

The Proportion of Children Choosing the Brilliant Child Versus the Hardworking Child Across Age, by Target Gender and Target Race



Note. Circles represent individual participants, and the shaded regions represent the 95% confidence intervals. See the online article for the color version of this figure.

effects did not reach significance, children's social preference of Asian targets mirrored that of Black targets.

In the second set of analyses, we contrasted children's responses toward White children versus children of color by combining the Black and Asian target pairs. This decision was motivated by past work showing that, unlike children's tendency to attribute brilliance more to White men than to White women, they seem to hold opposite gendered beliefs about Black people and Asian people. When making brilliance judgments of Black people, children were more likely to choose Black women than Black men (Jaxon et al., 2019). Children were also more likely to pick Asian women as brilliant compared to Asian men (Shu et al., 2022). Since children's gendered beliefs of Black and Asian individuals' brilliance were similar in past work (Jaxon et al., 2019; Shu et al., 2022) as well as in the present study, we combined these two racial categories. Given the *dissociation* between brilliance and boys of color, children may not show an increasing preference toward boys of color who choose to engage in brilliance-required (vs. effort-required) activities. Vice versa, children may gradually develop a preference for girls of color engaged in brilliance-required (vs. effort-required) activities.

To test these predictions, we performed a separate mixed-effects logistic regression model, including participant age (continuous in years; mean-centered), target race (i.e., White children, children of color; categorical), and target gender (i.e., girl, boy; categorical) as well as their interactions as predictors, and a random intercept for participants. This model revealed a significant three-way interaction between participant age, target gender, and target race, $\chi^2(1) = 10.43$, $p = .001$. Next, for each target gender, we performed a mixed-effects logistic regression model on children's social preference with participant age, target race (White children vs. children of color) and their interaction as predictors, and a random intercept for participants.

White Boys Versus Boys of Color

The analysis revealed a significant interaction between participant age and target race, $\chi^2(1) = 4.28$, $p = .039$, indicating that with age, participants provided varying social preference to White boys versus boys of color pursuing the brilliant (vs. hardworking) game (Figure 2). Follow-up simple slope tests suggested that children became marginally more likely to prefer the brilliant White boy (vs. the hardworking White boy), $B = 0.19$, $SE = 0.11$, $p = .080$, 95% CI $[-0.025, 0.363]$, $OR = 1.21$, whereas there was no association between participant age and their tendency to prefer boys of color who chose to play the brilliance- versus effort-focused game, $B = -0.07$, $SE = 0.08$, $p = .372$, 95% CI $[-0.209, 0.074]$, $OR = 0.93$.

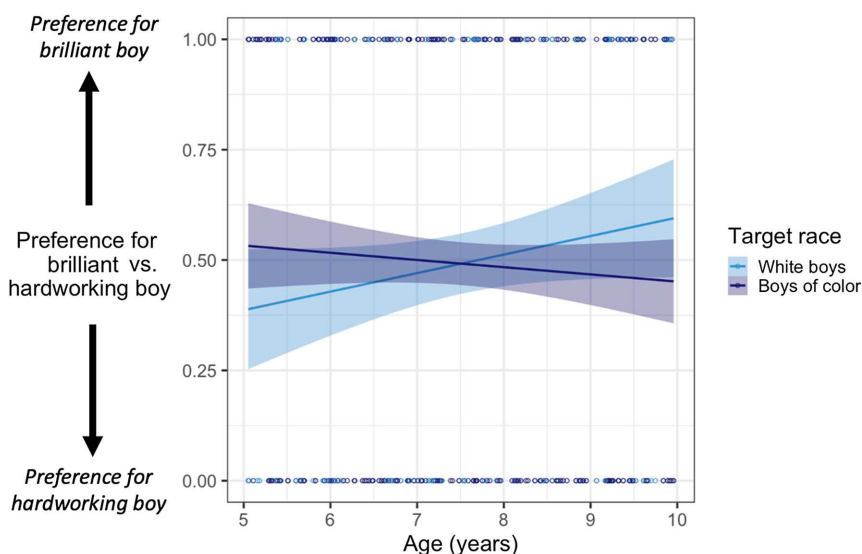
White Girls Versus Girls of Color

A similar model was conducted to test whether children provided similar or different levels of social preference to White girls versus girls of color. There was a significant interaction between participant age and target race, $\chi^2(1) = 5.56$, $p = .018$ (Figure 3). As noted earlier, age was not related to children's social preference for the brilliant White girl (vs. the hardworking White girl), $B = -0.12$, $SE = 0.11$, $p = .292$, 95% CI $[-0.293, 0.091]$, $OR = 0.89$. With respect to Black and Asian girls, children with age became more likely to favor those pursuing the brilliant game (vs. the hardworking game), $B = 0.19$, $SE = 0.08$, $p = .023$, 95% CI $[0.029, 0.299]$, $OR = 1.20$.

Discussion

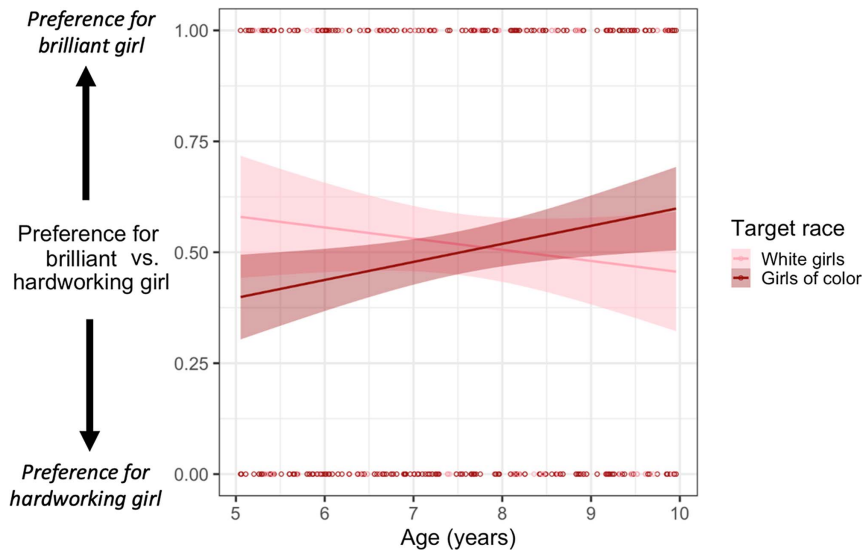
The present study investigated the developmental changes in children's social preference for White, Black, and Asian boys and girls who express interests in brilliance-required (vs. effort-required) activities. The research revealed two main findings. First, children

Figure 2
The Proportion of Children Choosing the Brilliant Boy Versus the Hardworking Boy Across Age, by Target Race



Note. Circles represent individual participants, and the shaded regions represent the 95% confidence intervals. See the online article for the color version of this figure.

Figure 3
The Proportion of Children Choosing the Brilliant Girl Versus the Hardworking Girl Across Age, by Target Race



Note. Circles represent individual participants, and the shaded regions represent the 95% confidence intervals. See the online article for the color version of this figure.

with age became more likely to prefer White boys pursuing activities requiring brilliance (vs. activities requiring effort), whereas this increasing preference did not extend to White girls. As children develop, peers become more influential in shaping each other's attitudes, behaviors, and academic goals and achievements (Cialdini & Goldstein, 2004; Gommans et al., 2017). It is plausible that, with increasing peer preference from others, boys would be more likely to opt in for brilliance-required activities and persist in pursuing them. In fact, past work suggests that experiencing social approval can serve as a potent motivator (e.g., Moss-Racusin et al., 2010; Tomasello, 2014). Future work should include direct motivation measures to explore how varying levels of social preference in contexts emphasizing brilliance shapes boys' and girls' activity and career choices.

Second and importantly, our study presented evidence that the gendered social preference for peers engaged in brilliance-related activities depends on the peer's perceived race. Children's increasing preference for White boys who favored the brilliance-focused (vs. effort-focused) activity did not apply to Black boys or Asian boys making the same activity choices. We found that there was no association between participant age and their tendency to prefer boys of color who chose to play the brilliance- versus effort-focused game. This varying social preference may stem from children's nuanced stereotypical beliefs about brilliance. Children in early elementary school years begin to assimilate the gender stereotype attributing high intellectual talents to men compared to women (Bian et al., 2017; Kim et al., 2024). However, this gender stereotype applies to White people more strongly than to racial minorities. In particular, children associate brilliance with White men (vs. White women), yet they are less likely to perceive Black men or Asian men as being exceptionally intelligent compared to their respective female counterparts (Jaxon et al., 2019; Shu et al., 2022). This differential manifestation of the gender

brilliance stereotype by race is likely due to children's tendency to perceive White men as more prototypical members of men than men of racial minority groups (Lei et al., 2020; Purdie-Vaughns & Eibach, 2008). As a result, White boys, rather than boys of color, are direct targets of the brilliance stereotype. Children thus may harbor favorable attitudes specifically toward White boys pursuing activities portrayed as requiring high intelligence.

We found evidence that children became more likely to favor girls of color pursuing the activity requiring brilliance (vs. hard work), which also aligns with previous work with adults showing that Black women face less backlash when exhibiting masculine attributes (Leigh & Desai, 2023; Livingston et al., 2012). Because Black women are perceived as less prototypical of women (Johnson et al., 2012), they may escape from common gender stereotypes and are evaluated more positively when demonstrating intellectual talents. However, Black women are significantly underrepresented in science, technology, engineering, and mathematics careers and other brilliance-required fields (National Center for Science and Engineering Statistics, 2022). We reasoned that although girls of color received increasing peer preference when choosing brilliance-required activities, they may be subject to other obstacles in their academic and career pursuits. For example, Black women suffer from unique biases that may steer them away from certain careers (McGee & Bentley, 2017; Perry et al., 2012; Riegle-Crumb & Grodsky, 2010). In addition, systemic barriers may set structural constraints blocking their way from pursuing some academic domains (Charleston et al., 2014; Ireland et al., 2018; Ong et al., 2011). More generally, traditional gender roles (Dicke et al., 2019; Eagly & Wood, 2012), biases downgrading women's quality of work (Moss-Racusin et al., 2018), and masculine disciplinary culture (Cheryan et al., 2009; Vial et al., 2022) can contribute to the pervasive gender disparity disadvantaging

women in general. Taking an intersectional perspective to identify specific obstacles for different groups of people would provide a foundation to devise effective interventions to enhance equality more precisely.

Our findings also contribute to the burgeoning research on children's social preference between perceived naturals (i.e., individuals believed to possess innate intellectual ability) and strivers (i.e., individuals believed to work hard). Prior studies suggest that children may shift from preferring naturals to strivers as they get older (Ma et al., 2022; Yang et al., 2024). For example, 5- to 6-year olds tend to judge individuals who possess innate intellectual abilities more positively than those who acquire these abilities through effort (Lockhart et al., 2013; Ma et al., 2022). This preference toward natural talents appears to be weaker or even reversed in children older than age seven as well as in adults (Lockhart et al., 2013; Noh et al., 2019; Yang et al., 2024). However, our results seem to stand in contrast to this general developmental trend, suggesting that the development of children's preference for naturals versus strivers is more complex and may depend on the individuals' perceived gender and race. Social stereotypes about who possesses "a spark of genius" may play a critical role in shaping children's social evaluations of naturals and strivers, leading them to favor certain groups than others. These findings highlight the importance of considering joint social identities when studying children's social biases.

There are several limitations that should be considered when evaluating the present study. Though children's social preference for a brilliant versus a hardworking peer followed a similar developmental trajectory to their acquisition of racialized gender stereotypes about brilliance, drawing direct connections between the two sets of beliefs will require additional data. In addition, each participant received six total test trials—only one trial for each gender and race intersection. Including more trials and child characters for each intersection would allow us to explore the consistency and variations in children's social choices, as well as speak to the generalizability of these findings. Relatedly, though our sample size exceeded those of past studies on similar topics ($N_s = 96$ and 144 in Bian et al., 2017; $N = 145$ in Alto & Mandalaywala, 2023) and children's own identity did not appear to moderate their social preference (see Supplemental Material), collecting a larger sample with children from more diverse backgrounds would allow us to examine these questions with more power. Lastly, we used forced choice measures to probe children's social preference between characters who enjoyed playing the brilliance-focused versus effort-focused game. Though being hardworking is a relatively gender-neutral attribute, future work asking children to provide evaluations on continuous scales can provide more insights on their social attitudes of peers engaged in brilliance-required activities.

In conclusion, the current research examined young children's social preference toward boys and girls engaged in activities that emphasize brilliance. As children grew older, they tended to show stronger preference toward White boys and girls of color pursuing these activities. In contrast, children did not show a similar increase in their preference for White girls or boys of color who chose brilliance-required activities. These findings highlight the significance of applying an intersectional lens to identify the precise developmental mechanisms contributing to disparities at the crossroads of gender and race.

References

- Alto, A. T., & Mandalaywala, T. M. (2023). Boys and girls, men and women: Do children take stimulus age into account when expressing gender stereotypes? *Developmental Psychology*, 59(4), 637–643. <https://doi.org/10.1037/dev0001504>
- Bennett, M. (1996). Men's and women's self-estimates of intelligence. *The Journal of Social Psychology*, 136(3), 411–412. <https://doi.org/10.1080/00224545.1996.9714021>
- 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>
- Bian, L., Leslie, S. J., & Cimpian, A. (2018). Evidence of bias against girls and women in contexts that emphasize intellectual ability. *American Psychologist*, 73(9), 1139–1153. <https://doi.org/10.1037/amp0000427>
- Bian, L., Leslie, S. J., Murphy, M. C., & Cimpian, A. (2018). Messages about brilliance undermine women's interest in educational and professional opportunities. *Journal of Experimental Social Psychology*, 76, 404–420. <https://doi.org/10.1016/j.jesp.2017.11.006>
- Blakemore, J. E. O. (2003). Children's beliefs about violating gender norms: Boys shouldn't look like girls, and girls shouldn't act like boys. *Sex Roles*, 48(9–10), 411–419. <https://doi.org/10.1023/A:1023574427720>
- Carter, D. B., & McCloskey, L. A. (1984). Peers and the maintenance of sex-typed behavior: The development of children's conceptions of cross-gender behavior in their peers. *Social Cognition*, 2(4), 294–314. <https://doi.org/10.1521/soco.1984.2.4.294>
- Charleston, L. J., George, P. L., Jackson, J. F., Berhanu, J., & Amechi, M. H. (2014). Navigating underrepresented STEM spaces: Experiences of Black women in U.S. computing science higher education programs who actualize success. *Journal of Diversity in Higher Education*, 7(3), 166–176. <https://doi.org/10.1037/a0036632>
- Cheryan, S., Plaut, V. C., Davies, P. G., & Steele, C. M. (2009). Ambient belonging: How stereotypical cues impact gender participation in computer science. *Journal of Personality and Social Psychology*, 97(6), 1045–1060. <https://doi.org/10.1037/a0016239>
- Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, 55(1), 591–621. <https://doi.org/10.1146/annurev.psych.55.090902.142015>
- Cole, E. R. (2009). Intersectionality and research in psychology. *American Psychologist*, 64(3), 170–180. <https://doi.org/10.1037/a0014564>
- Conry-Murray, C., Kim, J. M., & Turiel, E. (2015). Judgments of gender norm violations in children from the United States and Korea. *Cognitive Development*, 35, 122–136. <https://doi.org/10.1016/j.cogdev.2015.04.002>
- 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*, 1989, Article 8. <https://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8>
- Dicke, A. L., Safavian, N., & Eccles, J. S. (2019). Traditional gender role beliefs and career attainment in STEM: A gendered story? *Frontiers in Psychology*, 10, Article 1053. <https://doi.org/10.3389/fpsyg.2019.01053>
- Donovan, R. A. (2011). Tough or tender: (Dis)similarities in White college students' perceptions of Black and White women. *Psychology of Women Quarterly*, 35(3), 458–468. <https://doi.org/10.1177/0361684311406874>
- Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, 109(3), 573–598. <https://doi.org/10.1037/0033-295X.109.3.573>
- Eagly, A. H., & Wood, W. (2012). Social role theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 2, pp. 458–476). Sage Publications. <https://doi.org/10.4135/9781446249222.n49>
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>

- Fisk, S. R., & Overton, J. (2019). Who wants to lead? Anticipated gender discrimination reduces women's leadership ambitions. *Social Psychology Quarterly*, 82(3), 319–332. <https://doi.org/10.1177/0190272519863424>
- Furnham, A., Reeves, E., & Budhani, S. (2002). Parents think their sons are brighter than their daughters: Sex differences in parental self-estimations and estimations of their children's multiple intelligences. *The Journal of Genetic Psychology*, 163(1), 24–39. <https://doi.org/10.1080/00221320209597966>
- 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>
- Gálvez, R. H., Tiffenberg, V., & Altszyler, E. (2019). Half a century of stereotyping associations between gender and intellectual ability in films. *Sex Roles*, 81, 643–654. <https://doi.org/10.1007/s11199-019-01019-x>
- 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>
- Goff, P. A., Thomas, M. A., & Jackson, M. C. (2008). "Ain't I a woman?": Towards an intersectional approach to person perception and group based harms. *Sex Roles*, 59(5–6), 392–403. <https://doi.org/10.1007/s11199-008-9505-4>
- Gommans, R., Sandstrom, M. J., Stevens, G. W., Ter Bogt, T. F., & Cillessen, A. H. (2017). Popularity, likeability, and peer conformity: Four field experiments. *Journal of Experimental Social Psychology*, 73, 279–289. <https://doi.org/10.1016/j.jesp.2017.10.001>
- Hentschel, T., Heilman, M. E., & Peus, C. V. (2019). The multiple dimensions of gender stereotypes: A current look at men's and women's characterizations of others and themselves. *Frontiers in Psychology*, 10, Article 11. <https://doi.org/10.3389/fpsyg.2019.00011>
- Horst, J. S., & Hout, M. C. (2016). The Novel Object and Unusual Name (NOUN) Database: A collection of novel images for use in experimental research. *Behavior Research Methods*, 48(4), 1393–1409. <https://doi.org/10.3758/s13428-015-0647-3>
- Ireland, D. T., Freeman, K. E., Winston-Proctor, C. E., DeLaine, K. D., McDonald Lowe, S., & Woodson, K. M. (2018). (Un)hidden figures: A synthesis of research examining the intersectional experiences of Black women and girls in STEM education. *Review of Research in Education*, 42(1), 226–254. <https://doi.org/10.3102/0091732X18759072>
- 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>
- Killen, M., Lee-Kim, J., McGlothlin, H., Stangor, C., & Helwig, C. C. (2002). How children and adolescents evaluate gender and racial exclusion. *Monographs of the Society for Research in Child Development*, 67(4), i–vii, 1–119. <https://doi.org/10.1111/1540-5834.00218>
- Kim, S., Jin, K., & Bian, L. (2024). Gender brilliance stereotype emerges early and predicts children's motivation in South Korea. *Child Development*, 95(3), 913–928. <https://doi.org/10.1111/cdev.14043>
- Kirkcaldy, B., Noack, P., Furnham, A., & Siefen, G. (2007). Parental estimates of their own and their children's intelligence. *European Psychologist*, 12(3), 173–180. <https://doi.org/10.1027/1016-9040.12.3.173>
- Kwan, K. M. W., Shi, S. Y., Nabbijohn, A. N., MacMullin, L. N., VanderLaan, D. P., & Wong, W. I. (2020). Children's appraisals of gender nonconformity: Developmental pattern and intervention. *Child Development*, 91(4), e780–e798. <https://doi.org/10.1111/cdev.13316>
- Lazaro, V., & Bian, L. (2024, June 11). *Children's social preference for peers engaged in brilliance-required activities: The impact of gender and race*. https://bpb-us-w2.wpmucdn.com/voices.uchicago.edu/dist/b/2760/files/2024/06/LazaroBian_2024.pdf
- Lei, R. F., Foster-Hanson, E., & Goh, J. X. (2023). A sociohistorical model of intersectional social category prototypes. *Nature Reviews Psychology*, 2(5), 297–308. <https://doi.org/10.1038/s44159-023-00165-0>
- Lei, R. F., Leshin, R. A., & Rhodes, M. (2020). The development of intersectional social prototypes. *Psychological Science*, 31(8), 911–926. <https://doi.org/10.1177/0956797620920360>
- Leigh, A., & Desai, S. D. (2023). What's race got to do with it? The interactive effect of race and gender on negotiation offers and outcomes. *Organization Science*, 34(2), 935–958. <https://doi.org/10.1287/orsc.2022.1629>
- Leslie, S. J., Cimpian, A., Meyer, M., & Freeland, E. (2015). Expectations of brilliance underlie gender distributions across academic disciplines. *Science*, 347(6219), 262–265. <https://doi.org/10.1126/science.1261375>
- 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. <https://doi.org/10.1177/0956797611428079>
- LoBue, V., & Thrasher, C. (2015). The Child Affective Facial Expression (CAFE) set: Validity and reliability from untrained adults. *Frontiers in Psychology*, 5, Article 1532. <https://doi.org/10.3389/fpsyg.2014.01532>
- Lockhart, K. L., Keil, F. C., & Aw, J. (2013). A bias for the natural? Children's beliefs about traits acquired through effort, bribes, or medicine. *Developmental Psychology*, 49(9), 1669–1682. <https://doi.org/10.1037/a0030769>
- Ma, S., Tsay, C. J., & Chen, E. E. (2022). Preference for talented naturals over hard workers emerges in childhood and shapes behavior. *Child Development*, 94(3), 674–690. <https://doi.org/10.1111/cdev.13886>
- McGee, E. O., & Bentley, L. (2017). The troubled success of Black women in STEM. *Cognition and Instruction*, 35(4), 265–289. <https://doi.org/10.1080/07370008.2017.1355211>
- Meyer, M., Cimpian, A., & Leslie, S. J. (2015). Women are underrepresented in fields where success is believed to require brilliance. *Frontiers in Psychology*, 6, Article 235. <https://doi.org/10.3389/fpsyg.2015.00235>
- Moss-Racusin, C. A., Phelan, J. E., & Rudman, L. A. (2010). When men break the gender rules: Status incongruity and backlash against modest men. *Psychology of Men & Masculinity*, 11(2), 140–151. <https://doi.org/10.1037/a0018093>
- Moss-Racusin, C. A., Sanzari, C., Caluori, N., & Rabasco, H. (2018). Gender bias produces gender gaps in STEM engagement. *Sex Roles*, 79(11–12), 651–670. <https://doi.org/10.1007/s11199-018-0902-z>
- Muradoglu, M., Horne, Z., Hammond, M. D., Leslie, S. J., & Cimpian, A. (2022). Women—Particularly underrepresented minority women—And early-career academics feel like impostors in fields that value brilliance. *Journal of Educational Psychology*, 114(5), 1086–1100. <https://doi.org/10.1037/edu0000669>
- Nabbijohn, A. N., MacMullin, L. N., Kwan, K. M. W., Santarossa, A., Peragine, D. E., Wong, W. I., & VanderLaan, D. P. (2020). Children's bias in appraisals of gender-variant peers. *Journal of Experimental Child Psychology*, 196, Article 104865. <https://doi.org/10.1016/j.jecp.2020.104865>
- National Center for Science and Engineering Statistics. (2022). *Survey of earned doctorates (SED)* (NSF 22-300). National Science Foundation. <https://www.nsf.gov/statistics/srvydoctorates/>
- Noh, J. Y., D'Este, A., & Killen, M. (2019). Effort or outcome? Children's meritorious decisions. *Journal of Experimental Child Psychology*, 178, 1–14. <https://doi.org/10.1016/j.jecp.2018.09.005>
- Ong, M., Wright, C., Espinosa, L. L., & Orfield, G. (2011). Inside the double bind: A synthesis of empirical research on undergraduate and graduate women of color in science, technology, engineering, and mathematics. *Harvard Educational Review*, 81(2), 172–208. <https://doi.org/10.17763/haer.81.2.t022245n7x4752v2>

- Perry, B. L., Link, T., Boelter, C., & Leukefeld, C. (2012). Blinded to science: Gender differences in the effects of race, ethnicity, and socioeconomic status on academic and science attitudes among sixth graders. *Gender and Education*, 24(7), 725–743. <https://doi.org/10.1080/09540253.2012.685702>
- 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>
- R Core Team. (2021). *R: A language and environment for statistical computing* [Computer software]. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Riegle-Crumb, C., & Grodsky, E. (2010). Racial-ethnic differences at the intersection of math course-taking and achievement. *Sociology of Education*, 83(3), 248–270. <https://doi.org/10.1177/0038040710375689>
- Rivera, L. A., & Tilcsik, A. (2019). Scaling down inequality: Rating scales, gender bias, and the architecture of evaluation. *American Sociological Review*, 84(2), 248–274. <https://doi.org/10.1177/0003122419833601>
- Shu, Y., Hu, Q., Xu, F., & Bian, L. (2022). Gender stereotypes are racialized: A cross-cultural investigation of gender stereotypes about intellectual talents. *Developmental Psychology*, 58(7), 1345–1359. <https://doi.org/10.1037/dev0001356>
- Storage, D., Charlesworth, T. E., Banaji, M. R., & Cimpian, A. (2020). Adults and children implicitly associate brilliance with men more than women. *Journal of Experimental Social Psychology*, 90, Article 104020. <https://doi.org/10.1016/j.jesp.2020.104020>
- Tomasello, M. (2014). The ultra-social animal. *European Journal of Social Psychology*, 44(3), 187–194. <https://doi.org/10.1002/ejsp.2015>
- Vial, A. C., Muradoglu, M., Newman, G. E., & Cimpian, A. (2022). An emphasis on brilliance fosters masculinity-contest cultures. *Psychological Science*, 33(4), 595–612. <https://doi.org/10.1177/09567976211044133>
- Vogel, T., Ingendahl, M., & Winkielman, P. (2021). The architecture of prototype preferences: Typicality, fluency, and valence. *Journal of Experimental Psychology: General*, 150(1), 187–194. <https://doi.org/10.1037/xge0000798>
- World Economic Forum. (2022, July 12). *The one chart you need to understand how income is distributed in the U.S.* <https://www.weforum.org/agenda/2022/07/household-income-distribution-wealth-inequality-united-states/>
- Yang, X., Zhao, X., Dunham, Y., & Bian, L. (2024). The development and predictors of a preference for strivers over naturals in the United States and China. *Child Development*, 95(2), 593–608. <https://doi.org/10.1111/cdev.14012>
- Zhao, S., Setoh, P., Storage, D., & Cimpian, A. (2022). The acquisition of the gender-brilliance stereotype: Age trajectory, relation to parents' stereotypes, and intersections with race/ethnicity. *Child Development*, 93(5), e581–e597. <https://doi.org/10.1111/cdev.13809>

Received December 11, 2023

Revision received June 6, 2024

Accepted June 7, 2024 ■