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The Acquisition of Gender Stereotypes about Intellectual Ability: Intersections with Race

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The common stereotype that brilliance is a male trait is an obstacle to women's success in many prestigious careers. This gender-brilliance stereotype is powerful in part because it seems to be acquired early in life and might thus shape girls' career aspirations. To date, however, research on this stereotype has not considered how its acquisition might intersect with (1) the other social identities that men and women are perceived to hold, and (2) the social identities that children themselves hold. The present study examined these open questions. First, we compared

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5- and 6-year-old children's (N = 203) assumptions about the intellectual abilities of White men and women with their assumptions about the intellectual abilities of Black men and women. Second, we compared White children's assumptions about the intellectual abilities of men and women with those of children of color (primarily Latinx, Black, and Asian). The results suggested two main conclusions: First, children learn to associate White men (vs. women), but not Black men (vs. women), with brilliance. In fact, children generally see Black men as less brilliant than Black women. Second, the results suggested that the stereotype associating White men with brilliance is shared by children regardless of their own race. These results add considerable nuance to the literature on the development of gender stereotypes about intellectual ability and have implications for policies that might be implemented to prevent the negative effects of these stereotypes.

Common cultural beliefs associate high-level intellectual ability with men rather than women (e.g., Gálvez, Tiffenberg, & Altszyler, 2019; Rivera & Tilcsik, 2019; Storage, Horne, Cimpian, & Leslie, 2016). This association—a facet of the broader gender stereotypes about competence (e.g., Fiske, Cuddy, Glick, & Xu, 2002)—acts as a gatekeeper, blocking many capable women's paths into prestigious careers where brilliance is valued (e.g., science, technology; Bian, Leslie, & Cimpian, 2018; Bian, Leslie, Murphy, & Cimpian, 2018; Leslie, Cimpian, Meyer, & Freeland, 2015; Meyer, Cimpian, & Leslie, 2015; Storage et al., 2016). In the present research, we investigated the acquisition of this gender-brilliance stereotype in early childhood. Because gender stereotypes shape children's motivation and performance from a young age (e.g., Ambady, Shih, Kim, & Pittinsky, 2001; Cimpian, 2010; Cimpian, Mu, & Erickson, 2012), with consequences that can last for a lifetime (Charles, Guryan, & Pan, 2018), evidence on the developmental trajectory of these stereotypes can help inform policies that mitigate their negative effects.

Initial evidence suggests that the gender-brilliance stereotype is present in children as young as six years of age (Bian, Leslie, & Cimpian, 2017) and predicts their attitudes and behavior in contexts where intellectual ability is made salient (Bian et al., 2017; Bian, Leslie, & Cimpian, 2018). However, this work has only investigated children's assumptions about the intellectual abilities of *White* men and women. Among adults, gender stereotypes apply differently to men and women depending on their other perceived identities, such as race (for a review, see Nicolas, la Fuente, & Fiske, 2017). For example, Black women are not penalized to the same extent as White women when acting as "tough," dominant leaders (e.g., Livingston, Rosette, & Washington, 2012). It is thus important to consider how gender and race intersect when investigating the acquisition of gender stereotypes about intellectual ability. In the present research, we compared children's judgments of brilliance about White men versus women with their judgments of brilliance about Black men versus women.

We also explored whether the acquisition of the gender-brilliance stereotype depends on whether children belong to the racial majority group (i.e., White) or a racial minority group (e.g., Latinx, Black, or Asian). While gender stereotypes are endorsed relatively uniformly within and across societies (e.g., Glick et al., 2000; Ridgeway, 2001; Williams & Best, 1990), there are also reasons to expect some variability across children from majority versus minority groups in the extent to which they endorse these stereotypes. For example, Nosek et al. (2007) found that White (adult) participants' implicit stereotypes about gender were generally stronger than those of minority participants (see also Dugger, 1988; O'Brien, Blodorn, Adams, Garcia, & Hammer, 2015). In the present research, we thus compared White children's stereotypic assumptions about the intellectual abilities of men versus women with the assumptions made by children of color (primarily Latinx, Black, and Asian).

We begin by briefly summarizing previous evidence on the acquisition of the stereotype associating brilliance with men (vs. women). We then motivate the intersectional perspective adopted in this work and proceed to describe our study.

Prior Evidence on the Early Acquisition of the Gender-Brilliance Stereotype

From a young age, children are motivated to identify the "typical" characteristics of their gender and conform to those characteristics (for reviews, see Martin & Ruble, 2004; Martin, Ruble, & Szkrybalo, 2002). This motivation, combined with children's sensitivity to social cues (e.g., Butler & Markman, 2014; Cimpian, 2010; Cimpian, Arce, Markman, & Dweck, 2007; Pomerantz & Kempner, 2013), explains why children acquire gender stereotypes even as early as age 2 or 3 (e.g., Gelman, Taylor, & Nguyen, 2004; Liben & Bigler, 2002; Signorella, Bigler, & Liben, 1993). Initially, gender stereotypes concern concrete dimensions, such as which toys or colors are appropriate for each gender (e.g., Serbin, Poulin-Dubois, Colburne, Sen, & Eichstedt, 2001). Soon after, however, children begin to acquire stereotypes about more abstract dimensions, such as status (e.g., Liben, Bigler, & Krogh, 2001) and ability (e.g., Ambady et al., 2001; Cvencek, Meltzoff, & Greenwald, 2011). By the second grade, for instance, children are more likely to associate math with boys rather than girls (Cvencek et al., 2011).

Importantly, children *act* based on the stereotypes they learn from those around them and from broader cultural messages. Early-acquired gender stereotypes about the intellectual abilities of men and women, for example, shape children's behavior and are likely to steer their interests away from activities and topics that they might have otherwise enjoyed (e.g., Ambady et al., 2001; Cimpian et al., 2012; Martin, Eisenbud, & Rose, 1995; McKown & Weinstein, 2003; Wigfield & Eccles, 2000). To date, most of the developmental work on stereotypes relevant to intellectual

ability has targeted specific domains, such as math, science, or verbal ability (for reviews, see Boston & Cimpian, 2018; Cheryan, Master, & Meltzoff, 2015). However, beyond these specific gendered domains, our culture also associates the broader notion of raw, innate intellectual talent—of brilliance and genius—with men more than women (e.g., Del Pinal, Madva, & Reuter, 2017; Elmore & Luna-Lucero, 2017; Gálvez et al., 2019; Leslie, Cimpian, et al., 2015; Rivera & Tilcsik, 2019). A growing body of work suggests that this broader stereotype serves to maintain gender gaps across a range of prestigious careers where intellectual talent is valued (e.g., Cimpian & Leslie, 2015, 2017; Ito & McPherson, 2018; Leslie, Cimpian, et al., 2015; Storage et al., 2016). It is thus important to understand when and how gender-brilliance associations develop.

Recently, Bian et al. (2017) investigated the acquisition of the gender-brilliance stereotype by assessing the extent to which 5- to 7-year-olds associate being "really, really smart" (a child-friendly way of describing brilliance) with one gender over the other. In line with evidence that young children show strong ingroup favoritism (e.g., Halim, Ruble, Tamis-LeMonda, Shrout, & Amodio, 2017; Powlishta, 1995; Shutts, Roben, & Spelke, 2013; Yee & Brown, 1994; Zosuls, Martin, & Hill, 2011), 5-year-old girls and boys generally selected people of their own gender as smart. In contrast, 6- and 7-year-old girls selected women and girls as being "really, really smart" less often than 6- and 7-year-old boys selected men and boys, and also significantly less often than 5-year-old girls did. These results suggest that, by 6 years of age, children begin to acquire the gendered notions of brilliance that are common among adults.

Two additional findings support the idea that the gender-brilliance stereotype is acquired early. First, Bian et al. (2017) found that 6- and 7-year-old girls, but not 5-year-old girls, showed less interest in novel activities than boys did when the activities were described as being for children who are really smart. This difference was absent when the same activities were described as being for children who try really hard. Second, Bian, Leslie, and Cimpian (2018) found that 5- to 7-year-old children selected fewer girls as teammates for an unfamiliar game when it was said to be for really smart children than when it was not. Notably, this bias did not vary significantly across participant gender, nor did it vary across the span from 5 to 7 years of age, suggesting that gendered notions of intellectual ability may, in some cases, emerge even earlier than suggested by Bian et al. (2017).

Although informative, these prior studies were limited in two respects. First, they used stimuli depicting only White women/girls and men/boys, overlooking the possibility that children's gender-brilliance associations might vary depending on the perceived race of the stereotype targets. Second, these prior studies did not examine whether children's own racial group membership relates to whether they associate brilliance with men. The present work addresses these key limitations by examining how targets' race and perceivers' race jointly shape children's

endorsement of gender stereotypes about brilliance. We now go on to motivate this "doubly intersectional" approach (i.e., an approach that simultaneously takes into account both the perceivers' and the targets' multiple identities) to the developmental study of the gender-brilliance stereotype.

The Potential Role of Targets' Race

In the United States, White men and women (i.e., the high-status racial majority) are seen as *typical* representations of men and women more broadly (e.g., Ghavami & Peplau, 2013; Purdie-Vaughns & Eibach, 2008). As a result, common gender stereotypes, including the prescriptions and proscriptions attached to them, apply more consistently to White men and women than to men and women belonging to racial minorities. Consider, for example, the stereotype that women should not act in assertive, dominant (i.e., agentic) ways. Black women in fact experience less backlash when displaying agentic behavior than White women do (e.g., Livingston et al., 2012; see also Rosette & Livingston, 2012; Rosette, Koval, Ma, & Livingston, 2016). Similarly, whereas agentic behavior is admired in White men, Black men who show such behavior can sometimes suffer backlash (e.g., Livingston et al., 2012). This backlash is due in part to the perception that Black men are aggressive and threatening (e.g., Correll, Park, Judd, & Wittenbrink, 2002; Eberhardt, Goff, Purdie, & Davies, 2004). Traces of such negative attitudes toward Black males can even be found in children: Four- and five-year-olds show more negative attitudes toward Black boys compared to Black girls, White boys, and White girls, whereas their attitudes toward the latter three groups are similar (Perszyk, Lei, Bodenhausen, Richeson, & Waxman, 2019).

These considerations suggest that the stereotypes associating men (vs. women) with brilliance may be tied most closely to *White* men (vs. women). Our study explored this possibility by assessing 5- and 6-year-old children's stereotypes about whether men or women are "really, really smart" in the context of both White and Black targets. We chose Black men and women as a comparison because American adults appear to perceive them as the least prototypical of the broader categories of women and men (Ghavami & Peplau, 2013). Because gender stereotypes about Black targets are most different from "general" gender stereotypes (whereas gender stereotypes about White targets are most similar; Ghavami & Peplau, 2013), comparing White and Black targets provides the strongest test of whether the gender-brilliance stereotype generalizes across racial groups. If children perceive Black men to be less prototypical as men and Black women to be less prototypical as women, perhaps children will not associate brilliance with Black men (vs. women), providing important new information about the scope of the gender-brilliance stereotype as it is being acquired.

The Potential Role of Perceivers' Race

Most prior work on whether perceiver group membership affects endorsement of stereotypes has compared groups that were directly targeted by certain stereotypes (e.g., women's stereotypes about women) with the corresponding outgroups (e.g., men's stereotypes about women). Less research has brought in—as we did in the current study—additional social identities that perceivers might hold beyond those targeted by the stereotypes under investigation (e.g., the stereotypes that White participants vs. participants of color have about men and women). Although gender stereotypes are widely endorsed (e.g., Glick et al., 2000; Williams & Best, 1990), there is also some evidence that perceivers' race matters (e.g., Dugger, 1988; Nosek et al., 2007; O'Brien et al., 2015; see also David, Schroeder, & Fernandez, 2019). For example, O'Brien et al. (2015) found that Black women were less likely than White women to implicitly associate STEM with men (see also Evans, Copping, Rowley, & Kurtz-Costes, 2011), and these implicit stereotype differences predicted Black women's greater likelihood of majoring in STEM fields relative to White women. More generally, it may be that gender stereotypes are not only *targeted* most directly at the members of a gender group who are perceived to be prototypical of that group (i.e., in the United States, White men and women) but also *endorsed* most strongly by these prototypical members (e.g., Nosek et al., 2007). In contrast, members of a gender group who are perceived to be nonprototypical, such as men and women of color in the United States, may endorse "general" gender stereotypes less strongly and thus be more likely to engage in counter-stereotypical activities (Livingston et al., 2012; Purdie-Vaughns & Eibach, 2008).

We explore the role of perceivers' race in the acquisition of gender-brilliance stereotypes by comparing the extent to which White children associate men (vs. women) with being "really, really smart" with the extent to which children of color (primarily Latinx, Black, and Asian) do. The research reviewed above suggests two competing hypotheses: The first is that gender stereotypes about brilliance will be largely consensual in childhood (i.e., similar regardless of children's own race), either in the aggregate (i.e., across White and Black targets) or at finer levels of granularity (e.g., with regard to White targets only). The second hypothesis is that White children, similarly to White adults (e.g., Nosek et al., 2007; O'Brien et al., 2015), will show a stronger, or earlier, tendency than children of color to associate men (vs. women) with being "really, really smart."

The Present Research

The stereotypic association between brilliance and men is a likely contributor to women's underrepresentation in some of the most prestigious careers in our society (e.g., Leslie, Cimpian, et al., 2015). To the extent that this association

is acquired early in life, it may be particularly difficult to combat; thus, an understanding of its developmental trajectory provides crucial information for any policies seeking to block its effects.

Although the first traces of a gender-brilliance stereotype seem to appear in early elementary school (Bian et al., 2017; Bian, Leslie, & Cimpian, 2018), prior work did not consider the ways in which gender intersects with other social identities, such as race, in the acquisition of this stereotype. The present study addresses this gap in the literature and investigates the acquisition of the gender-brilliance stereotype among 5- and 6-year-old children from a doubly intersectional perspective, taking into account how gender intersects with race in both targets and perceivers.

We targeted 5- and 6-year-olds in this study for two reasons. First, prior evidence suggests that the gender-brilliance stereotype emerges between the ages of 5 and 6, at least in some majority-White U.S. samples and with respect to White targets (Bian et al., 2017; Bian, Leslie, & Cimpian, 2018). Thus, focusing on this window allowed us to investigate whether the gender-brilliance stereotype is *acquired* as an intersectional stereotype. The second reason for focusing on this early window is that intersectionality effects in children's attitudes toward girls and boys have been documented in children as young as 4 (e.g., Perszyk, Lei, et al., 2019). It is thus reasonable to expect that the extent to which children associate brilliance with men might differ from the very beginning depending on the targets' race or children's own race as perceivers.

Method

Participants

We recruited 203 children (105 girls, 98 boys) from two public elementary schools in New York City, U.S. As mentioned above, we focused on children aged 5 and 6 ($M_{age} = 5.8$ years, $SD = 0.6$) in part because this appears to be a key transition point in the acquisition of the gender-brilliance stereotype (Bian et al., 2017).[1] Demographic information was available from parents or legal guardians for 80.8% of the sample; of this subset, 37.2% identified as White, 29.9% as Latinx, 6.1% as Asian, 4.9% as Black, and 22.0% as multiracial (the majority of whom were Latinx and White) or another ethnicity. The sample was diverse in terms of socioeconomic status: One of the elementary schools served primarily low-income populations (68% of students were eligible for free or reduced-price lunch, according to New York State standards), and the other school had a

[1]Several children in the sample were slightly younger than 5 ($n = 13$, $M = 4.9$ years) or older than 6 ($n = 1$, 7.3 years). These children were incorporated into the nearest age group.

substantial population of low-income students as well (41% of students were eligible for free or reduced-price lunch).

A sensitivity power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that the present sample size provided 80% power to detect a minimum effect size of $r = .19$. Additionally, the size of this sample exceeded the sizes of the studies previously published on this topic (Ns = 96 and 144 from Bian et al., 2017; $N = 192$ from Bian, Leslie, & Cimpian, 2018).

Procedure and Measures

Parents or legal guardians provided written informed consent prior to testing. Sessions were conducted individually at each child's school. Experimenters audio-recorded the sessions and marked children's responses on a datasheet. The procedure, adapted from Bian et al. (2017), consisted of two tasks. The first was a training task, the goal of which was to gauge children's understanding of the key term "smart," as well as to provide the experimenter with an opportunity to reinforce or correct children's understanding. The training task was followed by the stereotype task, the goal of which was to assess children's gender-brilliance stereotype. After completing all measures, children were debriefed and thanked for their responses.

Training task. Children were told about an unfamiliar child who exhibited behaviors associated with intelligence (e.g., learning things really fast) and were then asked, "Is this child smart, not smart, or are you not sure?" Children were also asked an analogous question about the term "nice," which was used in the filler trials of the stereotype task (see Table S1 in the Supplementary Online Materials for the full script). The two questions were presented in random order. Children provided their responses either verbally or by pointing to a scale that depicted cartoon versions of a thumbs-up (to indicate "yes"), a thumbs-down (to indicate "no"), and a shrug (to indicate "unsure"). If children gave the correct response, the experimenter reinforced it (e.g., "That's right! Part of being smart means that you can always answer very difficult questions and you can learn things really quickly"). If children gave the incorrect response, the experimenter corrected them (e.g., "Actually, I think this child is smart. Part of being smart means that you can always answer very difficult questions and learn things really quickly"). Children's performance on this task was excellent (>80% correct responses for each question), suggesting that they had no trouble understanding the key terms.

Stereotype task. After the training trials, the experimenter administered the stereotype task. Following Bian et al. (2017), we measured children's stereotypes without overtly mentioning gender or race in order to avoid triggering ingroup bias. This task consisted of eight trials. On each trial, children saw a picture of

a pair of adults in a naturalistic setting (e.g., in a home, in an office).[2] The two people in each of the eight pairs were a woman and a man of the same race (four Black male/female pairs, four White male/female pairs). The pictures used in this study were selected from a larger pool based on the results of a norming study with 20 adult participants recruited via Mechanical Turk.[3] Children were told that one of the two individuals in each pair was "really, really smart" and were then asked to guess which one the smart individual was. If children hesitated or said they were unsure, experimenters prompted them to "take their best guess."

This task also included four filler trials, which were intended to distract children's attention from the purpose of the task by introducing some variety in the judgments they were asked to make. The filler trials differed from the stereotype trials in two respects. First, they involved same-gender pairs (one female/female Black pair, one male/male Black pair, one female/female White pair, and one male/male White pair), which helped to conceal our interest in gender. Second, they involved judging which of the two individuals was "really, really nice," which helped to conceal our interest in intellectual ability. The eight stereotype trials and four filler trials were interspersed and presented in one of two random orders (each the reverse of the other). The first trial was always a filler trial.

Principal components analyses performed on children's responses to the four White male/female pairs and, separately, the four Black male/female pairs revealed that two pairs (one from each set) had loadings $\leq .30$ on the first (unrotated) component; by comparison, all other pairs had loadings $\geq .45$. In addition, responses to the pairs with low loadings did not correlate with responses to the other three pairs in their set, $rs(201) \leq .12$, $ps \geq .08$. Thus, we dropped these two male/female pairs from subsequent analyses.

Analytic Strategy

Following Bian et al. (2017), the main dependent measure in this study was the proportion of White and (separately) Black male/female pairs for which a child chose the individual of their own gender as "really, really smart" (*own-gender brilliance score*). We analyzed children's own-gender brilliance scores

[2]Because prior work has suggested that the brilliance-gender stereotype seems to operate similarly for adult and child targets (e.g., Bian et al., 2017; Bian, Leslie, & Cimpian, 2018; but see Gunderson, Hamdan, Sorhagen, & D'Esterre, 2017), in this study we chose to focus just on children's judgments of adult targets (rather than including both child and adult targets).

[3]The participants in this norming study were shown each target individual in isolation and were asked to rate how attractive they were, how professionally dressed they were, how happy their expression was, and how old they were. The male and female targets we selected for the stereotype trials were well matched on all these dimensions. The participants also provided their best guess regarding each target's ethnicity (White vs. Black vs. other); we included only targets for which there was a consensus.

using mixed-effects multilevel linear models and linear regression models computed with the *mixed* and *regress* commands in Stata 13.1 (StataCorp, 2013), respectively. Follow-up comparisons were computed with the *contrast* and *margins* commands. All models included participant age (5-year-olds vs. 6-year-olds), participant gender (girl vs. boy), and their interactions with all other predictors. Depending on the question under investigation, the models also included the race of the target pair (White vs. Black) and participants' race (White vs. participant of color), plus their interactions with all other predictors.

We supplemented these models with three other analyses. First, we recoded children's responses to capture how often they chose men (rather than their own gender) as being "really, really smart" and compared these responses against chance (.50) and across certain cells of our design. Second, we meta-analyzed the data from the current study with those from Bian et al. (2017) study to arrive at a more robust estimate of children's gender-brilliance stereotype. Given the geographical and cultural differences between the two samples,[4] this meta-analytic estimate should also be more representative of the extent to which children across the U.S. endorse this gender-brilliance stereotype. Third, we calculated Bayes Factors for several null results that could differentiate between alternative interpretations of our findings. Failure to find a significant effect in null-hypothesis significance testing is not in and of itself evidence for the *absence* of an effect. A Bayes Factor comparing the null and alternative hypotheses can provide such evidence (if it exists). Bayes Factors indicate whether the data are more likely under the null or the alternative hypothesis; values lower than 1/3 and greater than 3 are generally thought to provide substantial evidence for a hypothesis (e.g., Dienes, 2014; Dienes & Mclatchie, 2018).

Open Data and Analytic Syntax

The data for this study and the analytic syntax are openly available on the Open Science Framework (OSF), https://osf.io/5qu4e/?view_only=43503e3b50a84fe29689c5660e303fcd. The full output of the models and follow-up contrasts reported below is interspersed with the syntax.

Results

We first describe the results pertaining to the role of stereotype targets' race: Do children's gender-brilliance stereotypes differ depending on whether they are

[4]For example, Illinois is more politically conservative compared to New York (e.g., Rentfrow et al., 2013) and has greater gender inequality in pay (e.g., New York has the 2nd smallest gender pay gap in the United States, whereas Illinois has 26th smallest; Joint Economic Committee, 2016).

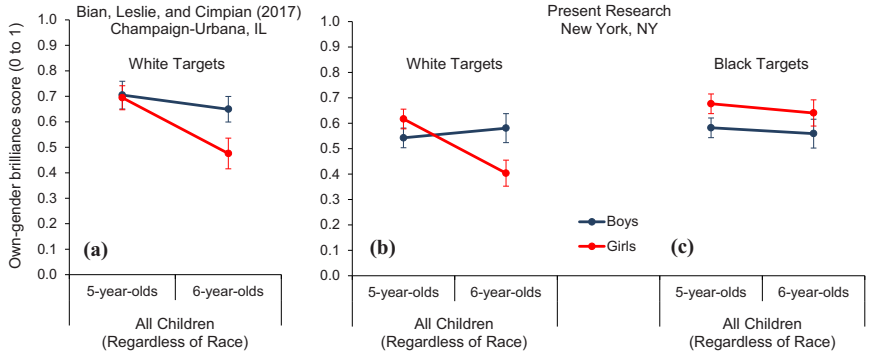

Fig. 1. The proportion of own-gender targets chosen as "really, really smart" for White targets in Study 1 of Bian et al. (2017) (Panel a) and in the present research (Panel b) and for Black targets (Panel c), by participant age and gender. Error bars represent ± 1 *SE*. [Color figure can be viewed at wileyonlinelibrary.com]

evaluating Black people or White people? Then, we report the results pertaining to the role of children's own race: Do the gender-brilliance stereotypes of children of color differ from those of White children?

The Role of Targets' Race

To explore the role of targets' race in the development of gender-brilliance stereotypes, we conducted a mixed-effects multilevel model with participant age (5-year-olds vs. 6-year-olds), participant gender (girls vs. boys), and target race (White male/female pairs vs. Black male/female pairs), as well as all their interactions, as categorical predictors of participants' own-gender brilliance scores. The model also included a random intercept for participant.

In prior work (Bian et al., 2017), the acquisition of the gender-brilliance stereotype for White targets was revealed by an interaction between participant age and participant gender: Boys' and girls' own-gender brilliance scores were similar at age 5, but a difference favoring boys emerged at older ages (see Figure 1a). If children's gender-brilliance stereotypes are different for White and Black targets, we should find that, in the present data, the two-way interaction above is moderated by targets' race. The results were consistent with this possibility: The mixed-effects model revealed a marginally significant three-way interaction between participant age, participant gender, and target race, $\chi^2(1) = 3.43$, $p = .064$ (see Figures 1b and 1c). Although this three-way interaction did not reach conventional significance levels, it was suggestive of a nonnull effect, so we explored the two-way interaction between participant age and gender separately for White and Black

targets; finding a difference between these two interactions would be consistent with the presence of an intersectionality effect.

For White targets, we found a two-way interaction between participant age and gender, $\chi^2(1) = 7.14$, $p = .008$. Boys' and girls' own-gender brilliance scores did not differ significantly at age 5, $\chi^2(1) = 1.86$, $p = .17$; in contrast, among 6-year-olds, girls' scores were lower than boys', $\chi^2(1) = 5.34$, $p = .021$. This interaction can also be unpacked by comparing 5- and 6-year-olds' responses within each gender: 6-year-old girls' own-gender brilliance scores were lower than those of 5-year-old girls, $\chi^2(1) = 11.01$, $p < .001$, whereas no such age difference was observed for boys, $\chi^2(1) = 0.31$, $p = .58$. These results replicate those of Bian et al. (2017; see Figure 1a), which were obtained with a less racially and socioeconomically diverse participant sample from a different part of the United States (Champaign-Urbana, Illinois).

For Black targets, in contrast, the two-way interaction between participant age and gender was not significant, $\chi^2(1) = 0.02$, $p = .89$. Both 5- and 6-year-old children chose mostly Black people of their own gender as "really, really smart" (see Figure 1c). However, as discussed above, failure to find a significant interaction between age and gender does not provide evidence for the absence of such an effect. To quantify the support for the null hypothesis, we calculated a Bayes Factor (*BF*) comparing two models: one without the two-way Age × Gender interaction term and one with it. This analysis, computed with the *brms* package in R (Bürkner, 2017), favored the model without the interaction term ($BF = 10.79$) and thus supported the null hypothesis of no two-way interaction effect. This evidence suggests that young children's stereotypic association of brilliance with men (vs. women) is intersectional from the moment it is acquired, in that it applies to White men and women but not Black men and women.

As a supplementary analysis, we recoded children's responses to examine how often they chose men (rather than their own gender) as being "really, really smart." In particular, this recoding allowed us to test whether 6-year-old boys *and* girls, as a whole, chose White men as "really, really smart" more often than expected by chance. Indeed, the average proportion of White male choices among 6-year-olds was .59, which was significantly above chance (.50), $t(58) = 2.16$, $p = .034$. For a more reliable estimate of the extent to which children in the United States associate brilliance with White men (vs. women), we meta-analyzed this average with the analogous average for the 6- and 7-year-olds in Bian et al.'s (2017) first study. The meta-analytic estimate of the mean, computed using the *metan* command in Stata, was $M+ = .582$ male selections, 95% $CI = [.534, .630]$. In contrast, the proportion of Black men selected as being "really, really smart" in the present study was only .45 overall, which was significantly below .50, $t(203) = 2.09$, $p = .038$. Among 6-year-olds, significantly more White men than Black men were chosen as being "really, really smart" (Ms = .59 and .45, respectively), $t(68) = 2.41$, $p = .009$. These additional analyses reinforce the conclusion that

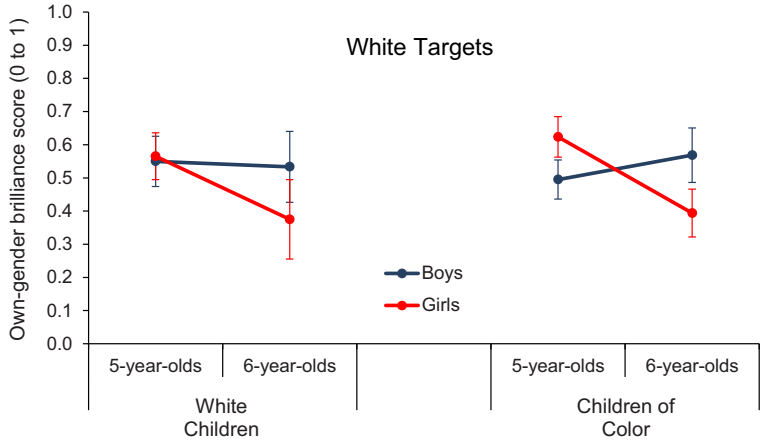

Fig. 2. The proportion of own-gender White targets chosen as "really, really smart," by participant race, age, and gender. Error bars represent ± 1 *SE*. [Color figure can be viewed at wileyonlinelibrary.com]

the gender-brilliance stereotype is intersectional from the earliest stages at which it is acquired.

The Role of Perceivers' Race

Because children's gender-brilliance stereotypes differed for White and Black targets, we explored the role of perceivers' race in two separate analyses: one on the data for White targets, and another on the data for Black targets. Each analysis included participant age (5-year-olds vs. 6-year-olds), participant gender (girls vs. boys), and participant race (White children vs. children of color), as well as all their interactions, as categorical predictors. The analyses reported in this section relied on regression models rather than mixed-effects models because there were no repeated observations. Finally, because not all parents filled out the forms with demographic information (which included the child's race), these analyses included data from only 164 children.

White targets. The model for this subset of 164 children replicated the key interaction between participant age and participant gender observed for White targets in the full sample (depicted in Figure 1b), $F(1, 156) = 5.16$, $p = .025$. The new question here concerns whether this interaction was moderated by participant race. The model revealed little evidence of such moderation: The three-way interaction between participant age, gender, and race was not significant, $F(1, 156) = 0.30$, $p = .58$ (see Figure 2). The Bayes Factor comparing the models with and without the three-way interaction term favored the model without the interaction term

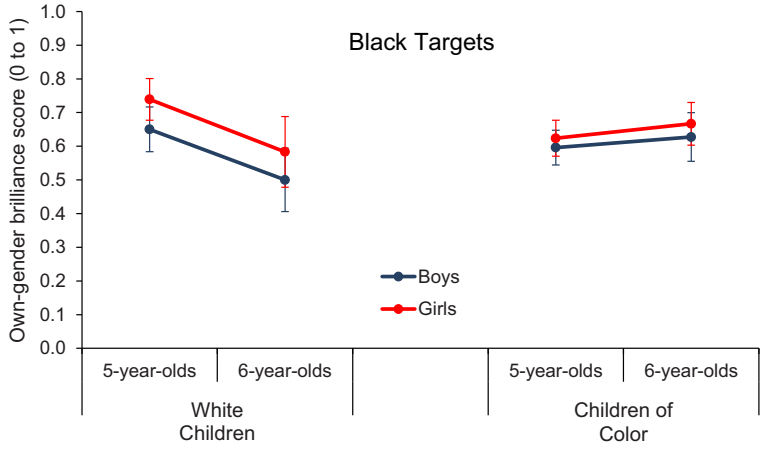

Fig. 3. The proportion of own-gender Black targets chosen as "really, really smart," by participant race, age, and gender. Error bars represent ± 1 *SE*. [Color figure can be viewed at wileyonlinelibrary.com]

($BF = 3.75$) and thus provided evidence for the absence of a three-way interaction effect. In sum, the analysis comparing the stereotypes of White children and children of color regarding White targets suggested that the stereotype associating White men (vs. women) with brilliance may be consensual.[5]

Black targets. The regression model on children's responses to the Black targets revealed that, as in the full sample (see Figure 1c), the key interaction between participant age and participant gender was not significant, $F(1, 156) < .01$, $p = .96$. Combined with the fact that the overall proportion of Black men selected as "really, really smart" was lower than .50, this result suggests (again) that children in our sample did not acquire a stereotype associating Black men with brilliance—at least not by the age of 6. The key question in the present section, however, is whether this Age × Gender interaction may be different when examining separately the responses of children of color versus White children: Is there a three-way interaction between participant age, gender, and race? This three-way interaction was not significant, $F(1, 156) = .01$, $p = .93$ (see Figure 3), and the Bayes Factor comparing models with and without the three-way interaction term also favored the model without the interaction term by a wide margin ($BF = 5.04$). This result suggests that neither children of color nor White children

[5]This conclusion is also consistent with a supplementary analysis reported by Bian et al. (2017), in which they found no evidence that children's gender-brilliance stereotypes (about White targets) were moderated by children's race. However, their sample consisted of 78% White children, so their conclusions were necessarily more tentative.

learn to associate brilliance with Black men. (Recall, however, that only a small proportion of the children of color in this study were themselves Black. In future work, it will be useful to test whether this claim is also true of children belonging to the same racial group as the Black targets.)

The only other noteworthy result in this model was an unexpected, marginally significant two-way interaction between participant age and race, $F(1, 156) = 3.39$, $p = .068$. As illustrated in Figure 3, White children showed a slight age-related decline in (gender) ingroup bias when judging Black targets, $F(1, 156) = 3.33$, $p = .070$, whereas children of color did not, $F(1, 156) = 0.38$, $p = .54$.[6] To speculate, perhaps with age White boys and girls become less likely to consider Black men and women as being "like them" (i.e., as part of their ingroup), whereas boys and girls of color (most of whom were Latinx) do not similarly exclude Black men and women from the boundaries of the ingroup, potentially due to awareness of a shared identity as members of racial minority groups. Because this finding was both unexpected and relatively weak, we hold off on speculating further about its source.

Discussion

The present research makes two major contributions to the literature. First, it demonstrates the importance of intersectionality in understanding the acquisition of gender-brilliance stereotypes, and gender stereotypes more generally. Although previous developmental investigations of gender-brilliance stereotypes found some evidence that children associate brilliance with *White* men (vs. women; Bian et al., 2017; Bian, Leslie, & Cimpian, 2018), it was unclear whether children associate brilliance with men more than women *in general*. The present results suggest that children may not extend this stereotypic association to men and women of all racial backgrounds. In fact, the children in our sample perceived Black women to be *more* brilliant than Black men. This reversal of the typical stereotype of men as the more intellectually capable gender (e.g., Fiske et al., 2002) holds a key lesson for future investigations of the development of gender stereotypes: It cannot be taken for granted that the stereotypes children report with respect to girls/women and boys/men of a certain race (or even with respect to girls/women and boys/men "in general"; see Ghavami & Peplau, 2013) will generalize across racial groups. Gender stereotypes are likely to intersect with race—but potentially other social dimensions as well—from the moment they are acquired, and investigations that target stereotype acquisition should be designed accordingly.

[6]The same pattern was observed in an analysis that left out the Black children in the sample: Non-Black children of color did not show an age-related decline in (gender) ingroup bias toward Black targets, $M_{5\text{-}year\text{-}olds} = .60$ vs. $M_{6\text{-}year\text{-}olds} = .63$, $F(1, 148) = 0.14$, $p = .71$.

Although it is interesting to consider *why* children selected Black men less often than Black women as "really, really smart," our data do not speak to this issue, so we can only speculate. For instance, this result could be due in part to the negativity with which children view Black males from a young age (Perszyk, Lei, et al., 2019). These negative attitudes about (i.e., general negative evaluations of) Black males may then make it easier for children to associate negative rather than positive stereotypic traits with this group (see Kurdi, Mann, Charlesworth, & Banaji, 2019), which may explain the reversal of the "brilliance = men" association. Clearly, however, more research is needed to understand the sources of this phenomenon, as well as whether it is robust and generalizable to other U.S. samples.

In combination with prior work on the acquisition of the gender-brilliance stereotype (Bian et al., 2017; Bian, Leslie, & Cimpian, 2018), the present research makes a second contribution as well. Namely, it suggests that the stereotype associating White men (vs. women) with brilliance is likely consensual: Children from two geographically and culturally different regions of the United States (New York, NY, and Urbana-Champaign, IL; Bian et al., 2017; Bian, Leslie, & Cimpian, 2018) selected White men more than White women as "really, really smart" from the age of 6 on, and children's own race did not seem to moderate this pattern. Of course, since neither sample was nationally representative, we make this claim (i.e., that the stereotype associating brilliance with White men [vs. women] is consensual) with some tentativeness, and we look forward to seeing additional research on this topic.

Aside from these concrete contributions, at a broader level this research suggests that social category representations are relatively fine-grained even among young children. Children are not limited to considering race *or* gender in their social reasoning but in fact consider race *and* gender simultaneously when learning about others (see also Perszyk, Lei, et al., 2019). This conclusion is consistent with work in cognitive development that suggests the ability to cross-classify items (e.g., a banana is both a fruit and a dessert) emerges early in life (e.g., Nguyen & Murphy, 2003). Studying the effects of cross-classification in the social domain adds greater nuance to our understanding of stereotyping, demonstrating the added value of a diversity-oriented perspective to psychological science (Neblett, 2019).

Limitations and Future Directions

The present study has several limitations that should be kept in mind when evaluating its conclusions. Although the sample was larger than in previous studies on this topic and fairly diverse, an even larger sample would have been desirable, especially since studying stereotypes from an intersectional viewpoint relies on testing for interactions between demographic variables, and achieving sufficient statistical power to detect such interactions often requires large samples (e.g.,

Simonsohn, 2014). Perhaps due to the modest size of the sample, some of the effects reported here did not reach conventional levels of significance and should thus be interpreted with caution until replicated in subsequent work.

Several features of the stereotype measure might also be improved in future studies on this topic. For instance, the forced-choice format used in the present study, whereby children had to select either the man or the woman in a picture as "really, really smart," may have exaggerated the magnitude of the stereotype effects. In future work, it may be informative to compare the strength of the gender-brilliance stereotypes estimated with a forced-choice task such as ours versus a task in which children are allowed to express an egalitarian view (i.e., that either both or neither of the male and female target are "really, really smart"). It may also be useful to better align the training and stereotype-assessment phases of the measure. In the current version, the training phase elicited (and corrected, when needed) children's understanding of the key term "smart" in the context of a child protagonist, whereas the stereotype-assessment phase involved adult targets. We referred to a child protagonist in the training phase so that the behaviors associated with being smart (which were used to gauge comprehension of the term) would be familiar to our child participants. However, to the extent that what it means to be smart differs for children versus adults, better alignment of the training and stereotype-assessment phases would be desirable.

The current study investigated whether children associate brilliance with men; it is an open question whether children also associate brilliance with certain race groups more than others. Given that adults generally endorse stereotypes that portray certain groups as being less intelligent (e.g., Black people; Devine, 1989; Steele & Aronson, 1995), it is possible that children do as well. However, the present data, as well as prior work on intersectionality in adults, suggest that these race-brilliance stereotypes might intersect with gender and thus lead to more nuanced patterns. For instance, the belief that Black people are less intelligent may affect Black men more than Black women, in part because men are seen as more prototypical members of a race group (e.g., Ghavami & Peplau, 2013; Purdie-Vaughns & Eibach, 2008). Of course, even if future work were to suggest that minority women are spared from the brunt of race-brilliance stereotypes, that would not mean that they do not face barriers to success in science and other brilliance-oriented fields (e.g., Canning, Muenks, Green, & Murphy, 2019; Ozier, Taylor, & Murphy, 2019). We return to this point in the *Policy Implications* section below.

We also acknowledge that the present research provides only an initial, and somewhat limited, exploration of how the gender-brilliance stereotype intersects with race. For example, we only compared children's gender stereotypes about White and Black targets. In future work, it will be important to extend this work by assessing children's gender stereotypes about women and men from other groups (e.g., Latinx, Asian). The comparison with Asian targets may be particularly

informative in some respects, insofar as Asian people are positively stereotyped with respect to their intellectual abilities (e.g., Ambady et al., 2001), whereas most other racial-minority groups are not. Related to this point, in the present research we analyzed the gender-brilliance stereotypes of racial-minority children as a group rather than making finer-grained distinctions between minority groups or between monoracial and multiracial children (e.g., Albuja, Gaither, Sanchez, Straka, & Cipollina, 2019). While this comparison was motivated by prior findings suggesting a difference between racial-majority and -minority groups with respect to endorsement of gender stereotypes (e.g., Nosek et al., 2007; O'Brien et al., 2015), in future work it would be informative to examine some of the contrasts we did not examine here (and could not examine, given that the statistical power to detect such differences in our sample would have been too low).

Policy Implications

The present work has two broad implications for policies aimed at leveling the gender gaps observed in science, technology, and other careers in which high-level intellectual ability is prized. First, our findings reinforce the importance of early development as a target of intervention via policymaking. Given that (1) the stereotype that associates brilliance with White men over White women seems to be acquired during the early elementary-school years and that (2) stereotypes shape children's preferences and behaviors (e.g., Bian et al., 2017; Bian, Leslie, & Cimpian, 2018; Charles et al., 2018; Wigfield & Eccles, 2000), this gender-brilliance stereotype may divert many young women away from prestigious careers that they would have otherwise been willing and capable of pursuing (e.g., O'Brien et al., 2015). Policies intended to broaden children's image of intellectual ability might reverse this inequity, as might policies aimed at broadening children's stereotypes about who can pursue "genius" fields (e.g., Cheryan et al., 2015). To clarify, we do not claim that policies to combat stereotyping in childhood are sufficient to eliminate gender gaps—the obstacles that girls encounter beyond childhood certainly contribute to these gaps as well (e.g., Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012). Nevertheless, policies aimed at children may be a *necessary* aspect of policymaking on issues of gender equity. Without measures to promote young girls' involvement in science and related fields during the early years of schooling, we are not just missing a critical window in the development of their academic identities but also allowing a potential expertise gap to develop between boys and girls that might constrain subsequent career decisions.

A second, related implication of our work is that policies designed to address gender stereotyping in childhood and beyond must take into account how gender and race intersect. Blanket policies overlooking the fact that gender stereotypes might differ in content depending on stereotype targets' other social identities will

be less than effective. For example, while the current study suggests that Black women may not be seen as intellectually inferior to Black men, this does not mean that they will avoid facing prejudice as members of their racial group (e.g., Levin, Sinclair, Veniegas, & Taylor, 2002). Moreover, Black girls and women may face forms of discrimination that are unique to their status as members of multiple stigmatized groups. Because Black girls and women do not fit our society's templates of either women (for whom the prototype is a White woman) or Black people (for whom the prototype is a Black man), they may be cognitively "invisible" (e.g., Fryberg & Townsend, 2008; Purdie-Vaughns & Eibach, 2008; Schug, Alt, & Klauer, 2015; Sesko & Biernat, 2010). This invisibility takes various forms, such as Black women not being recognized as full-fledged members of the groups to which they belong (e.g., Schug et al., 2015) or not being treated as unique individuals but rather as interchangeable group tokens (e.g., Sesko & Biernat, 2010). Thus, policies designed to address barriers for White women may require a different approach than do policies addressing barriers for Black women, who face unique challenges of intersectional invisibility. The current work, along with other work investigating the obstacles faced by women of different racial backgrounds, provides an essential empirical foundation for policymaking.

Conclusion

The present study suggests that, by age 6, children begin to associate brilliance with White, but not Black, men. This association is present regardless of children's own racial group membership. This work demonstrates how adopting an intersectional framework lends valuable nuance to our understanding of social psychological phenomena. Such nuance, in turn, allows us to more precisely and comprehensively address important social issues such as the inequities facing women and racial minorities in the classroom and the workplace.

Supporting information

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

Table S1. Script for the Training Task.

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