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Do Female and Male Role Models Who Embody STEM Stereotypes Hinder Women's Anticipated Success in STEM?

Sapna Cheryan[1], John Oliver Siy[1], Marissa Vichayapai[1], Benjamin J. Drury[1], and Saenam Kim[1]

Abstract

Women who have not yet entered science, technology, engineering, and mathematics (STEM) fields underestimate how well they will perform in those fields (e.g., Correll, 2001; Meece, Parsons, Kaczala, & Goff, 1982). It is commonly assumed that female role models improve women's beliefs that they can be successful in STEM. The current work tests this assumption. Two experiments varied role model gender and whether role models embody computer science stereotypes. Role model gender had no effect on success beliefs. However, women who interacted with nonstereotypical role models believed they would be more successful in computer science than those who interacted with stereotypical role models. Differences in women's success beliefs were mediated by their perceived dissimilarity from stereotypical role models. When attempting to convey to women that they can be successful in STEM fields, role model gender may be less important than the extent to which role models embody current STEM stereotypes.

Keywords

stereotypes, role models, gender, STEM, anticipated success

Women are less likely than men to enter science, technology, engineering, and mathematics (STEM) fields (Hill, Corbett, & St. Rose, 2010)—a disparity that exists even when men and women are matched for quantitative ability and experience (Strenta, Elliott, Adair, Matier, & Scott, 1994). An important precursor to entering a field is anticipating success in it (Bandura, 1997; Wigfield & Eccles, 2000). An explanation put forth for the gender disparity in STEM participation is that women tend to underestimate their abilities to be successful in these fields (Correll, 2001; Ehrlinger & Dunning, 2003; Meece, Parsons, Kaczala, & Goff, 1982; Miura, 1987; Sax, 1994). One common way to convey to women that they can be successful in STEM is to expose them to a STEM role model, or someone who is successful in these fields and can be emulated (Lockwood & Kunda, 1997; Marx, Stapel, & Muller, 2005). It is widely accepted that female role models are more effective than male role models in inspiring girls and women to enter STEM fields (see Mattel's *Computer Engineer Barbie* and the National Academy of Sciences' book series *Women's Adventures in Science*). Yet, even as efforts to introduce women to female role models have become increasingly widespread, the proportion of women who pursue computer science and math at the college level has remained stagnant or even decreased over the past few decades (National Science Foundation, 2009). Are female role models more effective than male role models in encouraging women who are not already in STEM to believe they can succeed in these fields? We propose that when conveying to women their potential for future success, role model gender may be less important than the extent to which role models embody current STEM stereotypes.

Male-dominated fields can be unwelcoming to women on two dimensions. The first is gender ratio, or the extent to which there are more men than women in a field. A skewed gender ratio can activate negative stereotypes about women's abilities and bring about underperformance among women who have identified those domains as important to them (e.g., STEM majors; Inzlicht & Ben-Zeev, 2000; Murphy, Steele, & Gross, 2007; Sekaquaptewa & Thompson, 2003). Female role models protect women who are personally invested in STEM against the harmful effects of gender stereotypes by preventing underperformance (Marx & Roman, 2002), improving their self-views (Lockwood, 2006; Marx & Roman, 2002), and improving their implicit attitudes toward the domain (Stout,

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Dasgupta, Hunsinger, & McManus, 2011). However, concerns about negative gender stereotypes are less threatening to women who are not personally invested in the domain (Schmader, Johns, & Forbes, 2008; Steele, 1997). Indeed, among a sample of noncomputer science majors, perceived dissimilarity from computer science majors better predicted women's lack of interest in computer science than their concerns about negative gender stereotypes and their estimated percentage of men in computer science (Cheryan & Plaut, 2010; see also Cheryan, Plaut, Davies, & Steele, 2009; Walton & Cohen, 2007 for belonging threats in the absence of stereotype threat effects). Thus, deploying female instead of male role models in computer science, an intervention to counteract effects of negative gender stereotypes, may be less effective among our population of interest, namely women who are not already personally invested in these fields.

The second dimension of male-dominated fields that is unwelcoming to women is the extent to which the field is assumed to embody stereotypes that are incongruous with the female gender role (Cheryan et al., 2009; Diekman, Brown, Johnston, & Clark, 2010). In STEM, these stereotypes include a tendency toward social isolation and a singular focus on technology (Barbercheck, 2001). Computer scientists in particular are stereotyped as "computer nerds" who are socially awkward and obsessed with computers (Margolis & Fisher, 2002; Schott & Selwyn, 2000). In contrast, the female gender role prescribes many opposing characteristics—helping and working with others, being socially skilled, and attending to physical appearance (Cejka & Eagly, 1999; Diekman et al., 2010; Eagly & Steffen, 1984). Gender roles shape the way people see themselves (Eagly, 1987), and women report feeling dissimilar from people who fit STEM stereotypes (Cheryan et al., 2009). Feeling dissimilar from others causes people to contrast their self-views away from them, or believe themselves less likely to possess traits that others have (Brown, Novick, Lord, & Richards, 1992; Mussweiler, 2001, 2003). Women who encounter stereotypical STEM students may feel dissimilar from them and, as a result, underestimate their likelihood of succeeding in STEM. As a result, STEM-stereotypical role models who are supposed to inspire emulation may backfire and discourage those they were meant to benefit.

Though STEM stereotypes are incongruent with the female gender role, we propose that they can be conveyed by women as well. Examples abound in our society of women embodying characteristics that are incongruent with the female gender role (e.g., tomboys; Deaux & Lewis, 1984; Fagot, 1977; Rudman & Fairchild, 2004). When women embody STEM stereotypes, they may evoke in other women feelings of dissimilarity and cause contrasted self-views, despite their shared gender. Indeed, when presented with information about another person's gender and his or her gendered characteristics (e.g., sturdy, broad-shoulders), inferences about that person are based more on his or her gendered characteristics than on gender (Deaux & Lewis, 1984). When female role models embody these stereotypical traits, they may be just as powerful of a deterrent as when males embody them.

Overview and Hypotheses

In two studies, we investigate how gender and stereotypicality of role models influence success beliefs in computer science among a population of women who are not already in the field. In contrast to previous work that manipulated whether or not the role model was in the domain (Lockwood & Kunda, 1997; Marx & Roman, 2002; Marx et al., 2005) or perceived as competent (Buunk, Peiró, & Griffioen, 2007; Lockwood, Marshall, & Sadler, 2005; Marx & Roman, 2002; Marx et al., 2005), we vary stereotypes associated with the people in the domain (e.g., liking science fiction) while keeping STEM membership and perceived competence constant. This is important because it would demonstrate that even role models who are competent in STEM can hinder women's anticipated success in STEM to the extent that they embody STEM stereotypes.

We hypothesize that encountering a stereotypical computer science role model, irrespective of the role model's gender, will decrease women's—but not men's—success beliefs in computer science compared to encountering a nonstereotypical computer science role model or no role model. Moreover, we predict that feelings of dissimilarity to stereotypical role models will mediate women's decreased success beliefs. Finally, we predict that role model gender will have less of an influence on women's beliefs that they can be successful in STEM than role model stereotypicality. Given that women's underrepresentation in STEM is more attributable to inadequate recruitment than inadequate retention (Ceci, Williams, & Barnett, 2009; de Cohen & Deterding, 2009), understanding the factors that prevent women who are not already personally invested in STEM from feeling like they can succeed in STEM will be crucial to remedying gender disparities (Bandura, 1997; Betz & Hackett, 1981; Ehrlinger & Dunning, 2003; Miura, 1987; Wigfield & Eccles, 2000).

Study 1

Study 1 investigated whether interacting with a computer science role model influences women's success beliefs in computer science. To ensure role models would be relatable to our participants and their success in STEM attainable (Lockwood & Kunda, 1997), we used upper-level undergraduates as role models. This is similar to previous research (Lockwood et al., 2005; Marx & Roman, 2002; Stout et al., 2011) and to situations in which upper-level undergraduates are chosen to be role models for other undergraduates, for example, as teaching assistants and resident advisors. Stereotypicality of role models was manipulated using pretesting clothing, hobbies, and preferences that are associated with computer science majors (stereotypical) or average college students (nonstereotypical). Nonstereotypical role models were modeled on average college students, rather than on a more extreme stereotype violator, to reduce the likelihood that they would be subtyped as unrepresentative of the field (see Kunda & Oleson, 1995). This study also included a baseline condition (no role model)

Table 1. Stereotypical and Nonstereotypical Items in Both Studies

	Stereotypical	Nonstereotypical
Clothing	Glasses, a t-shirt that read "I code therefore I am," unfashionable pants, socks and sandals	Solid-colored shirt (v-neck t-shirt for women, polo for men), jeans, flip-flops
Hobbies	Playing video games, watching anime, and programming	Playing sports, hanging out with friends, and listening to music
Favorite movie	*Star Wars*	*American Beauty*
Favorite television show	*Mystery Science Theater 3000*	*The Office*
Favorite magazine	*Electronic Gaming Monthly*	*Rolling Stone*

to examine which condition drove effects. Finally, we tested for a potential alternative explanation: that stereotypical role models would arouse feelings of gender-based threat and therefore deter women from computer science (see Davies, Spencer, Quinn, & Gerhardstein, 2002).

Method

Participants were 85 female noncomputer science majors from the psychology participant pool. Noncomputer science majors were used to focus on recruitment. Two participants were eliminated because they did not remember the confederate's major.

Pretest

Students ($N = 31$; 22 women) were asked to list clothing and hobbies that they associate with computer science majors (stereotypical) and college students (nonstereotypical). Frequently listed clothing was consolidated to make the four outfits (i.e., male stereotypical, male nonstereotypical, female stereotypical, and female nonstereotypical), and the three most frequently listed hobbies in each category were selected[1] (see Table 1). To pretest the selected outfits, full-length photos of the outfits were superimposed onto male or female stick figures and rated by a separate sample ($N = 22$; 12 women) for how much each outfit fits the stereotype of a computer science major, on a scale from 1 (*not at all*) to 7 (*extremely*). Participants saw all four outfits, and order of presentation of outfits was counterbalanced. A 2 (Stereotypicality) × 2 (Outfit Gender) × 2 (Participant Gender) mixed-model analysis of variance (ANOVA) revealed the predicted main effect of outfit, $F(1, 20) = 67.82$, $p < .001$, $\eta_p^2 = .77$. Stereotypical outfits were rated as significantly more stereotypical ($M = 5.61$, $SD = .91$) than nonstereotypical outfits ($M = 3.34$, $SD = 1.13$). There were no other main effects or interactions. Two separate samples of students also rated how much they associated the selected preferences (i.e., favorite movie, magazine, and television show; see Table 1; $N = 27$; 13 women) and hobbies ($N = 33$; 19 women) with computer science majors. A 2 (Stereotypicality) × 2 (Participant Gender) ANOVA on preferences (averaged together) and another identical ANOVA on hobbies revealed that the stereotypical items were significantly more associated with computer science majors (preferences: $M = 4.40$, $SD = 1.45$; hobbies: $M = 5.39$, $SD = 1.22$) than the nonstereotypical items (preferences: $M = 2.43$, $SD = 1.02$; hobbies: $M = 3.24$, $SD = .96$), both Fs > 62, ps < .001, η_p^2s > .69. There were no other main effects or interactions.

Procedure

Participants interacted with one of four confederates (two White females, two White males) who posed as a fellow participant. Participants and confederates engaged in a "getting to know each other" task, which comprised of a list of printed questions to ask each other. The first four questions were answered by the confederates the same way regardless of stereotypicality: what is your first name ("Jennifer" or "David"), what year are you in school ("junior"), what are you majoring in ("computer science"), and where are you from ("Seattle"). Stereotypicality was manipulated via confederate clothing (see Table 1; photos available upon request) and answers to the last four questions: what are your hobbies, what is your favorite movie, what is your favorite television show, and what is your favorite magazine (see Table 1). Participants were randomly assigned to stereotypicality and gender conditions. All four confederates performed both stereotypical and the nonstereotypical conditions, and confederates were trained to have identical nonverbal behaviors and verbal fillers (e.g., "I like ...") across conditions. Order of who asked questions first was counterbalanced. Interactions lasted on average 1 min 41 s.

After the interaction, participants were separated from confederates and filled out a questionnaire in which they recalled their partner's responses. Success beliefs were assessed using two questions after they recalled their partner's major: "How well do you think you would do majoring in that field?" and "How well would you perform as someone who is a major in that field?" on scales from 1 (*not well at all*) to 7 (*very well*); adapted from Meece, Wigfield, and Eccles (1990), $r = .82$, $p < .001$.

To investigate dissimilarity as a potential mediator of the effect, participants were asked how similar they were to their partner on a scale from 1 (*not at all*) to 7 (*very much*). We also included questions on other potential mediators, including how well they got along with their partner, on a scale from 1 (*not at all*) to 7 (*very well*), and five questions assessing gender-based threat (e.g., "How anxious would you be about confirming a negative stereotype about your gender if you majored in that field?" $\alpha = .92$; adapted from Cohen & Garcia, 2005; Marx et al., 2005), on a scale from 1 (*not at all*) to 7 (*extremely*).

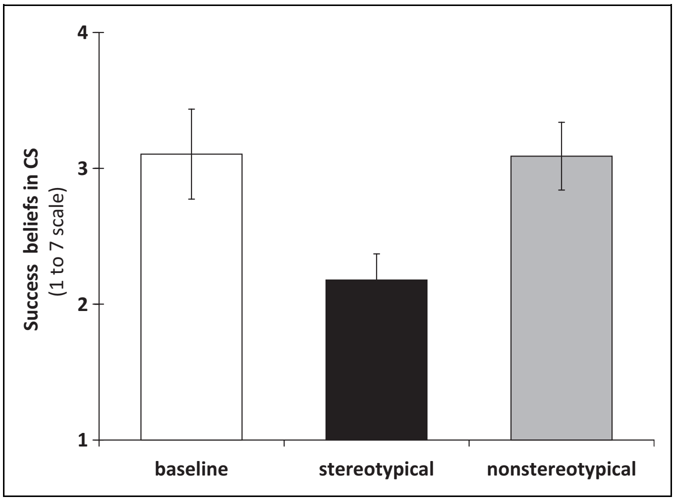

Figure 1. Women's beliefs about whether they will be successful in computer science (CS) after interacting with no role model (baseline), a stereotypical computer science role model, or a nonstereotypical computer science role model in Study 1.

Participants also indicated how intelligent they found their partner, on a scale from 1 (*not at all*) to 7 (*very much*).[2]

Some participants were randomly assigned to a baseline condition where they found out that their partner (gender unspecified) did not show up. They then drew slips to find out what major to rate (all slips said "computer science"). This study thus employed a 2 (Stereotypicality) × 2 (Role Model Gender) between-subjects design, with an additional baseline condition. The study concluded with demographic questions.

Results and Discussion

Success Beliefs

A 2 (Stereotypicality) × 2 (Role Model Gender) ANOVA revealed a main effect of stereotypicality, $F(1, 55) = 8.31$, $p < .01$, $\eta_p^2 = .13$. Women anticipated lower success in computer science after briefly interacting with a stereotypical ($M = 2.18$, $SD = 1.08$) compared to a nonstereotypical ($M = 3.09$, $SD = 1.32$) role model. There was no main effect of role model gender and no interaction, both Fs < 1, *ns*.

Comparison to Baseline

To examine baseline participants, we conducted a one-way ANOVA on success beliefs, collapsed across role model gender (because baseline participants did not encounter a role model), which revealed an effect of condition, $F(2, 80) = 4.61$, $p < .05$ (see Figure 1). Tukey's post hoc comparisons revealed that women in the baseline condition anticipated greater success ($M = 3.10$, $SD = 1.62$) than those in the stereotypical condition ($M = 2.18$, $SD = 1.08$), $p < .05$, $d = .67$, and a similar level of success to those in the nonstereotypical condition ($M = 3.09$, $SD = 1.32$), *ns*. Computer science role models who embody stereotypes of computer science are thus detrimental to women's anticipated success in computer science.

Perceived Dissimilarity

A 2 (Stereotypicality) × 2 (Role Model Gender) ANOVA on similarity revealed a main effect of stereotypicality, $F(1, 54) = 14.27$, $p < .001$, $\eta_p^2 = .21$. Women rated themselves as significantly less similar to stereotypical ($M = 2.67$, $SD = 1.52$) than nonstereotypical ($M = 4.00$, $SD = 1.12$) role models. There was also a weak marginal main effect of role model gender such that women rated themselves as marginally more similar to female ($M = 3.63$, $SD = 1.31$) than male ($M = 3.03$, $SD = 1.60$) role models, $F(1, 54) = 2.88$, $p = .10$, $\eta_p^2 = .05$. Stereotypicality and role model gender did not interact, $F < 1$, *ns*.

Success Beliefs Mediated by Perceived Dissimilarity

We examined whether the relationship between stereotypicality and success beliefs in computer science was mediated by perceived dissimilarity to stereotypical role models using the steps outlined by Baron and Kenny (1986) and the SPSS macro developed by Preacher and Hayes (2004), with 5000 bootstrapping resamples. In Steps 1 and 2, as seen above, compared to nonstereotypical role models, interacting with a stereotypical role model decreased success beliefs, $b = -.87$, $SE = .31$, $p < .01$, and decreased feelings of similarity, $b = -1.33$, $SE = .35$, $p < .001$. In Steps 3 and 4, similarity predicted success beliefs upon controlling for stereotypicality, $b = .34$, $SE = .11$, $p < .01$, and stereotypicality was no longer related to success beliefs, $b = -.42$, $SE = .33$, *ns*; Sobel $Z = 2.32$, $p < .05$ (95% CI: [–.82, –.14]). Thus, perceptions of dissimilarity to stereotypical role models compared to nonstereotypical role models accounted for women's lower success beliefs in computer science.

Alternative Explanations

A 2 (Stereotypicality) × 2 (Role Model Gender) ANOVA on gender-based threat revealed no main effects or interactions, $F(1, 55)$s < 1.28, ps > .26, suggesting that interacting with stereotypical role models did not arouse such concerns compared to interacting with nonstereotypical role models. A 2 (Stereotypicality) × 2 (Role Model Gender) ANOVA on how well participants got along with their partner also revealed no main effects or interactions, $F(1, 54)$s < 2.23, ps > .14, suggesting that confederates did not inadvertently change their interaction styles across conditions. To make certain that confederates' behaviors were constant across conditions, our next study used a different method that afforded complete control over confederates' behaviors.

Study 2

Study 2 assessed how computer science role models influence both women's and men's success beliefs. We hypothesized that because the incompatibility between computer science stereotypes and gender role is greater for females than males (Cheryan et al., 2009; Diekman et al., 2010), women's success beliefs would be affected by the stereotypical role model but men's success beliefs would be unaffected. Assessing effects on men is theoretically important because it reveals whether the process by which STEM stereotypes deter women is, as we predict, a gendered one, or whether there is something threatening or off-putting about the stereotypical role model to both women and men. We also moved Study 2 to a virtual environment, which enabled complete standardization of role models' behaviors across condition. Previous work has found that people act in virtual environments in accordance with their real-life social identities (Dotsch & Wigboldus, 2008; Eastwick & Gardner, 2009; McKenna & Bargh, 1998), and both men and women are influenced by interactions in virtual environments (e.g., Okita, Bailenson, & Schwartz, 2007).

Method

Participants included noncomputer science majors ($N = 88$) in the participant pool. Eight participants were eliminated for suspicion, six were eliminated for technical difficulties (e.g., avatar did not load properly), five were eliminated for living in the United States for 1 year or less because computer science stereotypes are different abroad (Othman & Latih, 2006; Varma, 2009), and one was eliminated for not remembering the role model's major.[3] A total of 68 participants (40 women) remained.

Participants were told that the study investigated "how a virtual world can be used as a tool for getting to know someone else." Participants learned that they would have a virtual interaction with another student (actually a confederate) located in another part of the building. Participants' photos were taken and ostensibly superimposed onto an avatar to "personalize their virtual self." This was to ensure that participants saw their partner's avatar as a representation of their partner's appearance. Participants were logged into Second Life, an online 3D virtual environment (http://secondlife.com). First-person view was utilized so that participants' own avatars were not visible. After completing a short tutorial on Second Life, participants navigated their avatars into a small room and sat down across from their partner's avatar. Stereotypicality of partner's avatar was manipulated using the same clothing (digitally represented; photos available upon request), hobbies, and stated preferences as Study 1. Gender of avatar was also manipulated.

Participants and confederates engaged in the same "getting to know each other" task used in Study 1, with identical confederate answers adapted for online chatting (e.g., "Oh ... I also really like listening to music"). Typed questions and responses appeared as text on screen. After interactions were complete, participants answered the same questions from Study 1 on success beliefs, $r = .70$, $p < .001$, and similarity to their partner.[4]

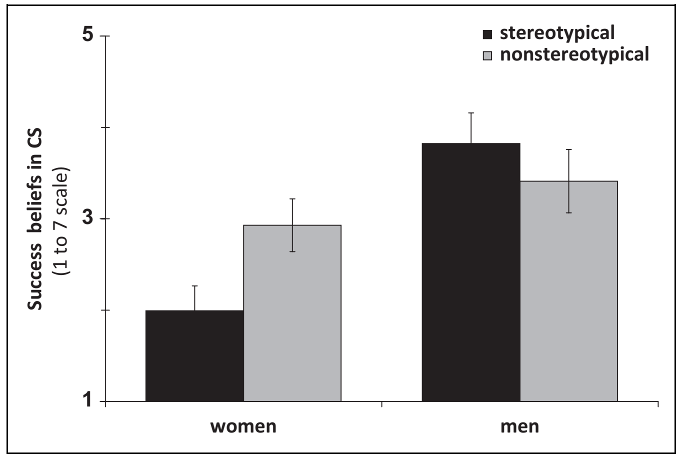

Figure 2. Women's and men's beliefs about whether they will be successful in computer science (CS) after interacting with a stereotypical or nonstereotypical computer science role model avatar in Study 2.

Results and Discussion

Success Beliefs

A 2 (Stereotypicality) × 2 (Participant Gender) × 2 (Role Model Gender) ANOVA on success beliefs revealed a main effect of participant gender, $F(1, 60) = 13.69$, $p < .001$, $\eta_p^2 = .19$. Women reported lower success beliefs in computer science ($M = 2.45$, $SD = 1.17$) than did men ($M = 3.59$, $SD = 1.38$). This main effect was qualified by the predicted Stereotypicality × Participant Gender interaction, $F(1, 60) = 4.65$, $p < .05$, $\eta_p^2 = .07$ (see Figure 2). For women, a brief, virtual interaction with a stereotypical role model lowered success beliefs in computer science ($M = 2.00$, $SD = .96$) compared to an interaction with a nonstereotypical role model ($M = 2.95$, $SD = 1.19$), $p < .05$, $F(1, 60) = 5.57$, $p < .05$, $\eta_p^2 = .09$. Men's success beliefs were unaffected by interacting with either the stereotypical ($M = 3.82$, $SD = 1.07$) or nonstereotypical ($M = 3.36$, $SD = 1.65$) role models, $F(1, 60) < 1$, *ns*. There were no other main effects or interactions. That men's success beliefs were not affected by exposure to stereotypical role models reveals that these stereotypes communicate to women, but not to men, a lower potential for success in the field.

Perceived Dissimilarity

A 2 (Stereotypicality) × 2 (Participant Gender) × 2 (Role Model Gender) ANOVA on similarity to role models revealed a main effect of stereotypicality, $F(1, 60) = 8.55$, $p < .01$, $\eta_p^2 = .13$. Participants felt less similar to stereotypical ($M = 2.89$, $SD = 1.39$) than nonstereotypical role models ($M = 3.91$, $SD = 1.04$). There was also a marginal main effect of Participant Gender, $F(1, 60) = 3.58$, $p = .06$, $\eta_p^2 = .06$, such that men reported more similarity ($M = 3.68$, $SD = 1.09$) than women ($M = 3.18$, $SD = 1.45$). These main effects were qualified by the predicted Stereotypicality × Participant Gender interaction, $F(1, 60) = 7.60$, $p < .01$, $\eta_p^2 = .11$. Women felt less similar to stereotypical ($M = 2.38$, $SD = 1.24$) than nonstereotypical role models ($M = 4.05$, $SD = 1.13$), $F(1, 60) = 20.02$, $p < .001$, $\eta_p^2 = .25$, while men felt equally similar to stereotypical ($M = 3.64$, $SD = 1.28$) and nonstereotypical ($M = 3.71$, $SD = .91$) role models, $F(1, 60) < 1$, *ns*. There were no other significant main effects or interactions.[5]

Women's, but Not Men's, Success Beliefs Mediated by Perceived Dissimilarity

Using the moderated mediation macro developed by Preacher, Rucker, and Hayes (2007) with 5000 bootstrapping resamples, we found significant Stereotypicality $\times$ Participant Gender interactions on perceived similarity and success beliefs (see above). When controlling for similarity, the Stereotypicality $\times$ Participant Gender interaction no longer predicted success beliefs, $b = .50$, $SE = .31$, *ns*. Conditional indirect effects at different values of participant gender revealed that for women, perceived dissimilarity was a significant mediator of the relationship between stereotypicality and success beliefs, $Z = 2.28$, $p < .05$, whereas for men, this mediation was not significant, $Z = .60$, *ns*. Women, but not men, contrasted their success beliefs away from stereotypical role models, whom they perceived as dissimilar from themselves.

General Discussion

Interacting with one member of a field, even briefly, can shape students' beliefs about their potential for success in that field. In two studies, we found that STEM role models who projected stereotypes of the field interfered with women's beliefs that they would be successful in STEM fields. Women are routinely exposed to these stereotypes in the media (e.g., CBS's popular *The Big Bang Theory*, currently in its fourth season), in advertisements (e.g., PEMCO Insurance's *Ponytailed Software Geek*), and even on websites designed to encourage high school girls to pursue engineering (e.g., http://EngineerYourLife.com features a female engineer who designs Star Wars video games and started programming at age 11). This is unfortunate because many who have achieved success in STEM do not fit these stereotypes (Borg, 1999), yet the proliferation of such stereotypical images in society may be preventing the next generation of potential female scientists from believing they can achieve success in STEM.

Including a baseline condition in Study 1 revealed that it was the stereotypical role model who drove the effects. Interestingly, exposure to nonstereotypical STEM role models did not improve women's beliefs about their potential for success over baseline. One explanation may be that nonstereotypical role models were not relevant enough to our participants because they were in a different field from their own (Lockwood & Kunda, 1997). Another possibility is that we modeled role models on "the average college student" rather than making them uniquely similar to our participants (e.g., same birthday; see Brown et al., 1992; Mussweiler, 2003; Stapel & Marx, 2007). In both studies, women's perceived similarity to the nonstereotypical role model was only at the midpoint. As a result, they might not have felt similar enough to the nonstereotypical role models to be influenced by them. One implication of this work is that selecting "average students" as representatives may not change the beliefs of those we hope to recruit, even if those average students share the same gender as the potential recruits. Future research should investigate whether STEM representatives who embody STEM-counterstereotypic (e.g., feminine) characteristics improve women's success beliefs.

Across both studies, female role models were no more effective in increasing women's beliefs about their potential for success than male role models. Role models typically provide more information about themselves than gender (e.g., interests, background), and such individuating information can override social category information in shaping inferences (Deaux & Lewis, 1984; Eagly & Wood, 1982; Jussim, Coleman, & Lerch, 1987; Jussim, McCauley, & Lee, 1995; Krueger & Rothbart, 1988; Locksley, Borgida, Brekke, & Hepburn, 1980; Rokeach & Mezei, 1966). Even a single piece of diagnostic information can be enough to prevent gendered inferences (Eagly & Wood, 1982; see also Kunda & Oleson, 1995; Locksley et al., 1980). The fact that women were equally influenced by male and female role models is also consistent with previous evidence that gender beliefs need to be salient in order to influence outcomes (Correll, 2004; Deaux & Major, 1987; Shih, Pittinsky, & Ambady, 1999). This may explain why studies have found that male and female role models are equally effective in inspiring women and girls to enter STEM fields (Baruch & Nagy, 1977; Canes & Rosen, 1995; de Cohen & Deterding, 2009; Downing, Crosby, & Blake-Beard, 2005; Lunneborg, 1982; Martin & Marsh, 2005) and why work in developmental psychology (e.g., Bobo doll study) demonstrates that children are equally likely to mimic male and female role models (see Maccoby & Jacklin, 1974 for a review).

A lack of gender influence in our studies, however, still resulted in gendered outcomes. Role models in STEM—whether male or female—who embodied stereotypes that are incongruent with the female gender role undermined women's beliefs about their ability to be successful in STEM while leaving men's beliefs intact. Note that we are not arguing that women never make better role models. For women who have already chosen the domain or are otherwise highly identified with it, female role models improve women's attitudes toward STEM (Stout et al., 2011) and protect their performance when negative stereotypes are salient (Marx & Roman, 2002; Marx et al., 2005; McIntyre, Paulson, & Lord, 2003). However, when it comes to recruiting women into STEM, role model gender may make less of a difference than whether role models fit stereotypes that are incompatible with the female gender role. Understanding when gender of role models matters and when STEM stereotypes have more of an influence will ensure that we are "rendering onto the right students the right intervention" (Steele, 1997, p. 624).

Declaration of Conflicting Interests

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Notes

1. We did not include drinking, listed as the third most common hobby for college students. In Study 1, male but not female nonstereotypical confederates stated sports as one of their hobbies; in Study 2, both male and female nonstereotypical confederates stated sports as a hobby.
2. At our university, it is well-known that becoming a computer science major requires a track record of success in computer science classes and competitive admission to the department. As a result, role models were rated as highly intelligent ($M = 6.16$, $SD = .68$), and a 2 (Stereotypicality) × 2 (Role Model Gender) ANOVA on ratings of intelligence revealed no main effects or interactions, $F(1, 53)$s < 1, *ns*.
3. A 2 (Stereotypicality) × 2 (Participant Gender) × 2 (Role Model Gender) chi square analysis on those eliminated revealed no significant effects, all $\chi^2(1)$s < 1, *ns*. There was therefore no difference in attrition rates between conditions.
4. Participants were also asked to indicate how attractive they found their partner on a scale from 1 (*not attractive at all*) to 7 (*very attractive*) to investigate a potential alternative explanation that differences in beliefs about success among women were driven by a desire to distance oneself from unattractive role models. Using Preacher and Hayes' (2004) bootstrapping macro to test mediation with 5000 resamples showed that ratings of attractiveness did not mediate the relationship between role model stereotypicality and success beliefs for women, Sobel $Z = 1.35$, *ns*.
5. There was a marginal three-way interaction of Stereotypicality × Participant Gender × Role Model Gender, $F(1, 60) = 2.96$, $p = .09$, $\eta_p^2 = .05$, which appeared to be driven by men's ratings. When role models were male, men tended to report more similarity to nonstereotypical than stereotypical role models, $p = .19$. However, when role models were female, men tended to report more similarity to stereotypical than nonstereotypical role models, $p = .21$.

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