Do people care if men don't care about caring? The asymmetry in support for changing gender roles ☆

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ABSTRACT

Not all instances of gender inequality are equally concerning. An emphasis on women's underrepresentation in Science, Technology, Engineering, and Math roles (STEM) has not been matched by a similar concern about men's underrepresentation in Healthcare, Early Education, and Domestic roles (HEED). The current research investigates whether and why people perceive gender imbalances in male-dominated careers (STEM and leadership) as more problematic than gender imbalances in female-dominated, caregiving careers (HEED). Results from four studies (total $N = 754$) document a tendency to more strongly support the inclusion of women in male-dominated careers, compared to the inclusion of men in female-dominated careers. This asymmetry in support for social action towards change is predicted by beliefs about what the *ideal* gender representation should be and the perceived causes of gender imbalances in each career type. Notably, gender representation in careers (and not salary) is the key factor underlying discrepant support for change (Study 4).

1. Introduction

Modern democratic societies place a great deal of value on gender equality in occupational opportunities. But are we equally concerned with women's and men's career opportunities and constraints? Over the past several decades, efforts to promote gender equality have included laws, policies, and programs designed to dismantle barriers to *women's* advancement, with a recent focus on increasing women's representation in science, technology, engineering, and math careers (STEM), as well as leadership positions. For instance, the National Science Foundation alone has allocated 270 million dollars since 2001 to multiple initiatives supporting women in the sciences (National Science Foundation, 2018). Similarly, companies invest millions of dollars to support female leaders through programs such as Goldman Sachs' *10,000 Women* initiative, which provides women with business education, mentorship, and funding (Goldman Sachs, 2018). The focus on supporting women's entry and advancement in these fields is partly justified by the low representation of women in lucrative STEM and leadership positions. Women comprise only 31% of employees in science and engineering fields (e.g., electrical engineering, computer science, civil engineering; National Science Foundation, 2017) and hold < 5% of the chief executive officer positions across all Fortune 500

companies (Fortune, 2017).

Although we have seen concerted efforts to increase women's representation in male-dominated careers and positions, men's stark underrepresentation in traditionally female-dominated careers and roles has remained stable (Croft, Schmader, & Block, 2015; England, 2010). Specifically, men's representation in healthcare, early education, and domestic roles (HEED) has not increased, and has even slightly declined between 1993 and 2013 (Bureau of Labor Statistics, 2013; Croft et al., 2015). As a result, men remain extremely underrepresented in care-oriented occupational fields such as nursing (10%) and elementary education (14%; Bureau of Labor Statistics, 2017). And yet academic researchers, policy makers, and the general public seem far less interested in efforts to promote greater gender balance in these careers, even though public health and education are both critical to the general well-being of society.

Data from all google searches in the past five years exemplifies this relative lack of concern. As depicted in Fig. 1, the Google-Trends data from this time period reveals that people are far less likely to search for "Men in Nursing" and "Men in Education" than for "Women in Engineering" or "Women in Tech". This is first hint of the extent to which the general public is more concerned with gender imbalances in male- rather than female-dominated professions. The goal of this research is
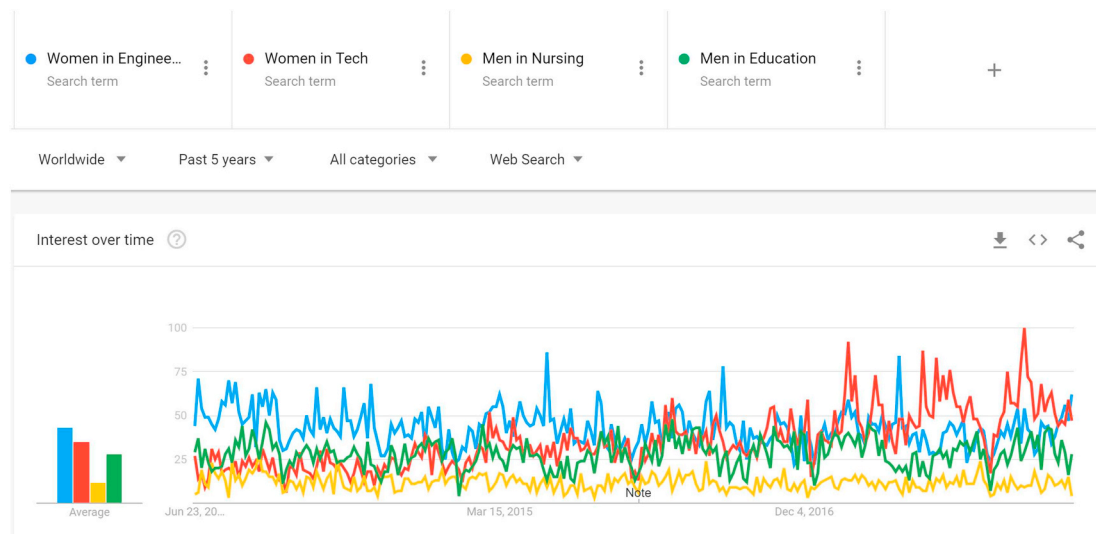
Fig. 1. Google-trends data for search terms about men and women over 5 years.

to better understand why people might not prioritize gender equality in female- (as compared with male-) dominated careers. In short, why don't people care if men don't choose caregiving careers?

In four studies, the current research examined whether perceivers are relatively less concerned about rectifying men's underrepresentation in female-dominated careers as compared with women's underrepresentation in male-dominated careers, and if so, what accounts for the apparent asymmetry in support for gender balance? Our studies tested the core hypothesis that people are more supportive of changing the gender imbalance in male- rather than female-dominated fields (*asymmetry in support for social action* hypothesis; Studies 1–4). We also systematically tested a theoretical explanation for *why* people are less inclined to support efforts to boost the representation of men in female-dominated careers as compared efforts to boost the representation of women in male-dominated careers. Specifically, we explored whether the discrepancy in support for change is predicted by people's lay theories about such gender imbalances. To this end, we examined the extent to which attributions and, in turn, support for changing gender balances are themselves predicted by the relatively lower status people assign to female- compared to male-dominated careers (Studies 2–4).

2. Supporting change that matters

The relative lack of concern for boosting men's representation in HEED careers is somewhat surprising given the potential benefits of increasing gender equality in communally-oriented careers (Croft et al., 2015). First, increasing men's participation in HEED could help to solve the significant and persistent labor shortages in teaching and nursing (Grant, 2016; Strauss, 2017). In addition, men themselves can benefit from pursuing communal (i.e., care-oriented) roles in HEED, which are not only psychologically fulfilling and linked to better health, but also offer viable job opportunities in a tight labor market (e.g., Bauer & McAdams, 2010; Le, Impett, Lemay Jr., Muise, & Tskhay, 2018). In addition, men's increased participation in HEED would likely benefit overall gender equality of a society. For example, men who take on non-traditional roles can enable women (Block, Croft, & Schmader, 2018) and girls (Croft, Schmader, Block, & Baron, 2014) to envision themselves in less traditional, complementary roles. Given these possible benefits, it is important to understand when and *why* people are willing to support the investment of resources aimed at changing such gender inequalities.

3. Understanding support for change

In addition to testing the key *asymmetry in support for social action* hypothesis, our current research sought to better understand why people might display asymmetric support for increasing gender equality in different domains. Of course, individuals with more traditional gender role attitudes are likely to be generally less supportive of efforts to promote gender balance in any career (Bolzendahl & Myers, 2004). In contrast to this focus on individual differences, our specific question was to identify factors that underlie an individual's *differential* support for promoting gender balance in male- vs female-dominated occupations. Specifically, we examined whether there are differences in people's perceptions of the *reasons* for the underrepresentation of men versus women that drive their asymmetry in support for change. In addition, we examined the extent to which differential perceptions of causes of underrepresentation are tied to the perceived status of the careers in which men and women are overrepresented.

4. Dissatisfaction motivates support for change

The first predictor of whether people support change in a domain should be whether they perceive a problem that they can act on. Indeed, findings from the collective action literature reveal that people and groups are motivated to support social action towards change when they are dissatisfied with the status quo (e.g., van Zomeren, Postmes, & Spears, 2008). Thus, the most proximal explanation for people's tendency to support social change in male-dominated careers more than in female-dominated careers is simply that people are more dissatisfied with women's underrepresentation in STEM and leadership than they are with men's underrepresentation in HEED. Study 1 was designed to examine this asymmetry in dissatisfaction. Studies 2–4 then delve deeper into explaining where such a discrepancy in concern might come from.

5. Attributions for imbalance explain the asymmetry in support for change

In the current research, we examine the theoretical proposition that asymmetries in support for social change between male- and female-dominated careers stem from the different lay attributions that people make for gender imbalances in these different fields. Attributions for the outcomes or actions of a group (or individual) can be roughly categorized as external (i.e., factors that are imposed from outside of the

group, such as discrimination) and internal (i.e., factors that stem from attributes and attitudes of the group itself, such as intrinsic motivation). In reality, both internal and external factors likely play a role in women's and men's underrepresentation in careers dominated by the other gender. For example, research has shown that gender differences in personal values relate to both women's relative disinterest in STEM (Diekman et al., 2017; Diekman, Brown, Johnston, & Clark, 2010;; Diekman, Steinberg, Brown, Belanger, & Clark, 2017) and men's relative disinterest in HEED (Block et al., 2018). Similarly, discrimination has been implicated both in women's avoidance of STEM careers (e.g., Smith, Sansone, & White, 2007) and men's avoidance of HEED roles (e.g., Ross, 2017). Our focus is not to identify the actual causes of occupational gender imbalances, but to better understand how people's lay perceptions of those causes might color their motivation to change gender imbalances.

Not all social inequalities are deemed to be equally worthy of efforts to change them. People tend to be dissatisfied with an unequal status quo and show support for changing it when the inequality in question is deemed to be illegitimate and unstable (Ellemers, Wilke, & Van Knippenberg, 1993; Hornsey et al., 2006; Klandermans, 2002, 2004; Mummendey, Kessler, Klink, & Mielke, 1999; Simon & Klandermans, 2001; van Zomeren, Saguy, & Schellhaas, 2013). It is important to note that not all inequalities are perceived as a problem. When unequal outcomes are deemed to be fair and legitimate, support for change is low even among those who are underrepresented or disadvantaged (Jost & Major, 2001; Major, 1994).

In the case of gender disparities in occupations, the perceived legitimacy and malleability of one group's underrepresentation is likely to be informed by how those disparities are explained. In past work, group differences that are attributed more to external factors (such as discrimination) than to internal factors (such as low ability or motivation) are likely to be seen as less legitimate and more malleable, promoting support for social change (e.g., Weiner, Perry, & Magnusson, 1988). Conversely, when people believe that the differentiation of men's and women's roles is due to more internal and stable factors, they are more satisfied with current division of labor between men and women (Kray, Howland, Russell, & Jackman, 2017) and tend to justify existing gender inequalities (Iatridis & Stergiou, 2016; Kray et al., 2017). For example, Schmader, Major, Eccleston, and McCoy (2001) found evidence for a *status value asymmetry* (a tendency for lower status groups to value majority-group domains, but for higher status groups to devalue minority-group domains) that only emerged when people believed that status differences between groups were legitimately tied to differences in abilities.

The current research sought to build on this existing social change literature to understand people's perceptions of the realistic occupational segregation of men and women. We hypothesized that people should be more dissatisfied with the gender imbalance in a given career, and thus more supportive of efforts to reduce that imbalance, to the extent that they perceive *external* factors (e.g., discrimination and other prohibitive social norms) as more essential, and *internal* factors (lack of motivation and/or lack of ability) as less essential drivers of the given gender imbalance. We expected this pattern of attributions to be more typical of how people understand women's underrepresentation in male-dominated careers, as compared with men's underrepresentation in female-dominated careers. Our theoretical rationale for this pattern of predictions is further rooted in the relative status awarded to men's and women's roles.

6. The role of status

One cannot understand gender roles without understanding the status differences inherent in them. The differential status granted to men and women, and to the roles they occupy, likely plays a key role in explaining the asymmetry in gender role change (Croft et al., 2015). According to status value theory, men's higher status in society means

that men's roles and careers are given higher status than those of women (Conway, Pizzamiglio, & Mount, 1996; Feinman, 1981; Ridgeway, 1991; Ridgeway & Correll, 2004). As a result, people value male-dominated domains more than female-dominated domains (Schmader et al., 2001). For example, when told that women score higher than men on a fictitious trait called 'surgency,' men in particular assumed this trait had less value and utility to them personally (Schmader et al., 2001).

Status differences between male- and female-dominated roles might also play a role in how people explain gender imbalances in different careers. If people automatically assume that female-dominated careers have relatively lower status, they might also assume that men are less intrinsically interested in HEED careers. Conversely, because status is assumed to be desirable (Schmader et al., 2001), they might take for granted that women would want high-status careers in STEM. Additionally, given salient examples of gender stereotypes, biases, and discrimination in STEM (e.g., the controversial memo distributed by James Damore within Google in 2017; Lewis, 2017), the average person heavily weighs prohibitive norms when trying to explain women's underrepresentation in male-dominated careers but might be less aware of external norms preventing men's entry into female-dominated careers. Thus, compared to women's underrepresentation in high-status STEM and leadership careers, men's underrepresentation in low-status HEED careers might be more likely to be attributed to lack of internal motivation and less likely to be attributed to prohibitive external factors - thus accounting for an asymmetry in support for change. We test this hypothesis and also disentangle the effects of gender-representation from effects of status in the current set of studies.

7. Current research and hypotheses

We examined the hypothesized asymmetry in support for social action to create gender balance in four studies. In Studies 1–3, participants rated a series of male-dominated STEM (e.g., computer programming, electrical engineering) and female-dominated HEED careers (e.g., nursing, elementary school teaching) using a within-subjects design. In Study 1, we also assessed participants' perceptions of the actual and ideal gender representation in these careers to isolate their relative dissatisfaction with gender imbalances. Having established an asymmetry in satisfaction with gender imbalance and support for change in Study 1, the remaining studies aimed to replicate that asymmetry and identify the attributions that explain it. In Studies 2 and 3, participants made ratings in response to graphs that presented the *actual* gender representation of a series of white-collar male- and female-dominated careers, which were closely matched on the degree of imbalance. Study 4 employed a between-subjects design to manipulate gender-distribution orthogonally to salary, in order to more stringently test how gender distribution (unconfounded by salary) affects differential support for social action.

Across studies, we predicted that people would show greater support for social change in male-dominated as compared to female-dominated careers. Studies 2–4 were designed to isolate why people might show this asymmetric support for change. On the basis of exploratory analyses in Study 2, we preregistered hypotheses for Studies 3 and 4, stating that people would explain the underrepresentation of men in female-dominated careers, more than the underrepresentation of women male-dominated careers, as stemming from a lack of motivation, which would predict, in turn, their relatively lower support for action to boost men's representation.

8. Study 1

8.1. Method

8.1.1. Participants

One hundred and seventy-three participants (79 male, 94 female)

were recruited to participate in an online survey of "people's beliefs, opinions, and lifestyles" using Amazon Mechanical Turk (MTurk). All participants resided in the United States and received $1.25. Participants were eligible for the study if they were located in the U.S. and had a HIT approval rate of at least 0.95. After 26 participants were excluded from the analyses for failing at least one of the two attention checks, the final sample included 147 participants (65 male, 82 female; M_{age} = 37.20 years, SD = 11.59; 76.9% White/Caucasian). A sensitivity analysis conducted in G*power suggested that with α = 0.05 and $1 - \beta$ = 0.80, our sample of 147 would be sufficient to detect a within-subjects difference of at least f = 0.12 (i.e., η_p^2 = 0.014), and a correlation of at least r = 0.20. Sample size was determined before any data analyses.

8.1.2. Procedure and measures

Participants completed measures as part of a larger pilot project on gender roles. Below, we describe the measures that are relevant to our hypotheses in the order they appeared in the survey; a full list of measured variables is included in Supplementary Online Materials (SOM).

8.1.2.1. Perceived gender distribution. Participants reported their perceptions of the gender distribution in 16 different careers (presented in random order) using a scale ranging from 0 (*Almost Only Men*) to 100 (*Almost Only Women*), with 50 (*Equal*) as the middle scale point. The list of careers included eight female-dominated (mostly HEED) careers (i.e., elementary school teacher, special education teacher, social worker, nurse, nutritionist, speech and language pathologist, social services, and human resources management) and eight male-dominated (mostly STEM and leadership) careers (i.e., mechanical engineering, electrical engineering, computer programming, software development, computer systems architect, architect, corporate management, CEO in organization). We selected careers that are white-collar (meaning they require at least a bachelor's degree), and in which women or men compose < 35% of employees for these STEM or HEED careers, respectively. Ratings were averaged to create reliable measures of perceived imbalance in the eight female-dominated occupations (α = 0.77), and the eight male-dominated occupations (α = 0.92). Higher scores on these raw composite variables always indicate greater female representation.

8.1.2.2. Ideal gender distribution. For each of the same 16 careers (again presented in random order), participants rated what they believed *should be the ideal* gender distribution on a scale ranging from 0 (*Men*) and 100 (*Women*). Again, ratings were averaged to create reliable measures of the ideal gender distributions for female-dominated (α = 0.88) and male-dominated (α = 0.96) occupations, with higher scores indicating a desire to have more women in the career.

8.1.2.3. Support for social action[1]. Participants made ratings of their own support for social change on a series of 20 items taken from Block et al. (2018); ten focused on rectifying men's underrepresentation in female-dominated occupations (e.g., "Occupations like nursing, teaching, and social work should be actively recruiting more men into such roles") and ten focused on improving women's representation in male-dominated occupations (e.g., "Occupations like engineering, computing, and management should be actively recruiting more women into such roles"). Participants rated each of these items on a

scale from 1 (*Strongly Disagree*) to 9 (*Strongly Agree*). Composite scores were created for *Support for Social Action in female-dominated* (α = 0.97) and *male-dominated occupations* (α = 0.97). See SOM for full measure.

8.1.2.4. Demographics. Participants reported their age, gender, sexual orientation, ethnicity, marital status, whether or not they have children, their highest level of education currently obtained, whether or not they consider their formal education/schooling complete, current profession, field in which their profession is in, and how many hours a week they currently work in a paid job. We included age, gender (male vs. female), and highest level of education (ranging from Elementary School to Professional Degree) in the analyses described below. For a full list of demographic measures see the SOM.

8.1.2.5. Attention checks. Participants encountered two attention checks embedded in rating scales. One attention check was randomly displayed in the Ideal Gender Distribution Scale ("If you are reading this, please make sure to move the cursor all the way to the LEFT, to 'MEN'."). Another attention check was presented after participants completed the key measures but before completing the demographics questionnaire (i.e., "If you are reading this statement, please make sure to choose number four on the scale.").

8.2. Results and discussion

8.2.1. Testing the asymmetry in support for social action

First, we tested our core asymmetry hypothesis with respect to participants' *support for social action*. As hypothesized, results of a one-way within-groups Analysis of Variance (ANOVA) on this measure indicated that participants reported stronger support for increasing women's representation in male-dominated occupations than men's representation in female-dominated occupations, $F(1, 146)$ = 13.91, $p < .001$, η_p^2 = 0.09. Means for this and other core variables are summarized in Table 1. Additional analyses suggested none of the effects in this study were significantly moderated by participant gender.[2]

8.2.2. Testing the asymmetry in dissatisfaction with the current gender distributions

We next examined the extent to which there were discrepancies between the perceived and ideal gender distributions in female- vs. male-dominated occupations. Results of a 2 (*Career-type*: male- vs. female-dominated) x 2 (*Rating-type*: perceived vs. ideal) within-subjects ANOVA yielded a significant main effect of Career-type, $F(1, 146)$ = 527.63, $p < .001$, η_p^2 = 0.78, that was qualified by a significant interaction, $F(1, 146)$ = 279.93, $p < .001$, η_p^2 = 0.66. Simple effects tests revealed that, unsurprisingly, participants perceived that in reality there are many more women in the female-dominated occupations (M = 70.59, SD = 9.36) than in the male-dominated occupations (M = 23.01, SD = 12.05), $F(1, 146)$ = 913.52, $p < .001$, η_p^2 = 0.86. What is more interesting, is that this gap, though still significant, was narrowed for ratings of the ideal gender distribution (female-dominated: M = 56.66, SD = 11.08; male-dominated: M = 42.74; SD = 13.71), $F(1, 146)$ = 61.83, $p < .001$, η_p^2 = 0.30.

To test the asymmetry hypothesis more directly, we next calculated a *distribution dissatisfaction score* for each career-type by subtracting participants' ideal distribution from their perceived distribution and then taking the absolute value of this difference so that higher scores indicated more dissatisfaction with the current gender distribution. A paired samples *t*-test indicated a significant difference in the

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[1] Before making ratings for their support for social action, participants rated their perceptions of *others'* support for social change on these same 20 items on a scale from *1* (*Others Strongly Disagree*) to *9* (*Others Strongly Agree*). Key regression results predicting the asymmetry in social action are robust to controlling for participants' perceptions of the asymmetry in others support. See SOM.

[2] In none of the studies did participant gender moderate effects on our primary outcome, support for social action. Interactions with participant gender on other variables were inconsistent across studies and did not change the interpretation of results. We thus do not further discussed interactions with participant gender in the main manuscript.

Table 1

Study 1 means (SD) and asymmetry scores for key variables.

	Male-dominated	Female-dominated	Asymmetry score (male–female career)
Perceived distribution	23.01 (12.05)	70.60 (9.36)	
Ideal distribution	42.74 (13.71)	56.66 (11.08)	
Distribution dissatisfaction score (perceived – ideal)	21.09 (12.82)	15.49 (11.00)	Asymmetry in dissatisfaction score 5.60 (11.68)
Social action support	6.63 (2.00)	6.24 (1.98)	Asymmetry in social action score 0.39 (1.27)

Note. Scales for Perceived Distribution and Ideal Distribution range from 0 to 100. Scale for Social Action Support ranged from 1 to 9.

Table 2

Study 1 regression model predicting the asymmetry in support for social action.

Coefficients	Step 1				Step 2			
	Beta	CI$_{.95}$	SE	p	Beta	CI$_{.95}$	SE	p
Gender	0.18	−0.15–0.51	0.167	0.272	0.21	−0.10–0.53	0.16	0.187
Age	−0.03	−0.20–0.13	0.007	0.701	−0.001	−0.16–0.16	0.007	0.986
Education	0.05	−0.11–0.21	0.048	0.552	0.02	−0.14–0.17	0.046	0.843
Distribution dissatisfaction					**0.32**	**0.16–0.48**	**0.08**	**< 0.001**
Observations			147				147	
R^2/adj. R^2			0.011/−0.009				0.111/0.086	

Note. Gender was coded as 0 = Male or 1 = Female. Education was coded from 1 = Elementary School to 9 = Professional Degree. Statistically significant regression coefficients are bolded for ease of reading.

distribution dissatisfaction score for female vs. male-dominated careers, $t(146) = -5.81$, $p < .001$, $d = 0.48$, CI$_{.95}$ (0.30, 0.63). In line with our asymmetry hypothesis, participants perceived the under-representation of women in male-dominated fields as significantly farther from their ideal than the underrepresentation of men in female-dominated fields.

8.2.3. Discrepancies in dissatisfaction predicting discrepancies in support for action

The results described above suggested that people both saw a greater perceived-to-ideal discrepancy in the gender distribution of male-dominated vs. female-dominated careers and also supported social action towards change more for male- vs. female-dominated careers. We next used linear regression to test whether the asymmetry in dissatisfaction was a key predictor of the asymmetry in support for social action. We created an *asymmetry in support for social action score* by subtracting the social action scores in female-dominated fields from the scores in male-dominated fields, so that higher scores indicate greater support for promoting equality in male- (vs. female-) dominated fields. We also created an *asymmetry in dissatisfaction score* by subtracting perceived-ideal discrepancy (*distribution dissatisfaction scores*) for female-dominated fields from their perceived-ideal discrepancy for male-dominated fields, so that higher scores indicated greater dissatisfaction in the distribution for male- (vs. female-) dominated occupations (see Table 1).

Finally, we regressed *asymmetry in social action* on *asymmetry in dissatisfaction* using a two-step hierarchical linear regression model. On Step 1, we entered covariates including participants' a) age, b) gender (0 = Male; 1 = Female), and c) highest level of education (1 = Elementary School to 9 = Completed Graduate or Professional Degree) to control for these possible third variable explanations for any relationship observed. On Step 2, we entered asymmetry in dissatisfaction as predictor. Results from this regression model (summarized in Table 2) revealed that, even when controlling for covariates, participants' greater dissatisfaction with the current gender distribution in male- (vs. female-) dominated fields predicted their greater support for social action to promote gender balance in male-dominated than in female-dominated fields.[3] Put differently, one reason people are not as

supportive of efforts to promote the inclusion of more men in female-dominated careers seems to be that they are less dissatisfied with the current gender imbalance in those careers.

To our knowledge, Study 1 is the first evidence documenting an asymmetry in people's support for social action towards increasing the gender balance in different types of occupations. People were generally aware that women are underrepresented in some careers but overrepresented in others, and tended to show dissatisfaction with this imbalanced status quo for both male- and female-dominated careers. Consistent with the status asymmetry hypothesis outlined in Croft et al. (2015), and as predicted, participants were both more dissatisfied with the gender imbalance in male-dominated careers than in female-dominated careers, and more supportive of social action to promote a more equal gender representation in male-dominated careers than in female-dominated careers (summarized in Table 1). Finally, the discrepancy in dissatisfaction between the two types of careers was significantly related to participants' tendency to show greater support for social action towards gender balance in male-dominated rather than in female-dominated fields.

9. Study 2

Study 1 provided initial descriptive evidence that people are less supportive of efforts to desegregate female- (than male-) occupations and that this asymmetry in support for change is linked to how dissatisfied people are with the status quo. A key goal of the following studies was to replicate this pattern and identify lay beliefs that help to explain it. Given that people tend to underestimate some social

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(footnote continued)

action for male ($M = 5.41$, $SD = 1.84$) versus female- ($M = 4.88$, $SD = 1.77$) dominated careers, $t(146) = -3.63$, $p < .001$, $d = 0.29$, CI$_{.95}$ (0.06, 0.52). This relative discrepancy was related to their own support discrepancy score, $r = 0.33$. We controlled for perceptions of discrepancy in others' support for social action (others support for change in male-dominated careers minus others' support for change in female-dominated careers) in Step 3 of the model. Even when adding the other support discrepancy score to the model, participants' relative dissatisfaction with current distributions was still uniquely predictive of their own support for change, $\beta = 0.31$, $SE = 0.08$, $t(141) = 4.15$, $p < .001$, CI$_{.95}$ (0.16, 0.46). The model including Step 3 can be found in the SOM.

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[3] Participants also perceived that other people are more supportive of social

inequalities (Kraus, Rucker, & Richeson, 2017; Norton & Ariely, 2011), one concern after Study 1 was that the asymmetry we identified might reflect differential accuracy in the degree of real imbalance in these different careers. To account for this potential confound, in Study 2 we selected male- and female-dominated careers that were matched in their degree of gender imbalance and then displayed this actual imbalance to participants using pie charts. Study 2 also included a measure of gender role attitudes so that we could establish whether any asymmetry in support for change was distinct from individual differences in support of traditional gender roles. Lastly, Study 2 was our first attempt at trying to isolate the effects of status from those of gender-representation in perceptions of careers; an issue to which we will return more deliberately in Study 4.

In addition, guided by Croft et al. (2015), we examined the degree to which people blame the imbalance on *external* factors (such discrimination and a lack of role models) and/or *internal factors* (such as a lack of motivation or ability). We examined how these explanations predict the asymmetry in support for social change. We also explored the perceived status differences between careers as a predictor of the asymmetry (and as mediated by attributions), given a theoretical model assuming that interpretations of events precede reactions to those events. Because these analyses for Study 2 were more exploratory, results from this study were then used to formulate the pre-registered hypotheses tested in Study 3.

9.1. Method

9.1.1. Participants

We recruited 252 participants (141 women, 108 men, three undisclosed[4]) from the United States from Amazon Mechanical Turk and paid them each $0.50 to participate in a study on "how people interpret graphical statistics." Participants were eligible for the study if they were located in the U.S. and had a HIT approval rate of at least 0.95. Participants were on average 34.43 (*SD* = 13.07) years old and predominantly Caucasian (84.1%). This study included no attention checks and no participants were excluded. A sensitivity analysis conducted in G*power suggested that with α = 0.05 and 1- β = 0.80, our sample of 252 would be sufficient to detect a within-subjects difference of at least $f = 0.09$ (i.e., $\eta_p^2 = 0.008$), and a correlation of at least $r = 0.16$. Sample size was determined before any data analysis.

9.1.2. Procedure

After providing informed consent, each participant was presented with and asked to make ratings of four occupations selected to represent a 2 (*Career-type*: male-dominated vs. female-dominated) × 2 (*Status*: white-collar vs. blue-collar) within-subjects design.[5] Participants were quasi-randomly assigned (using birth month) to one of five sets of four careers presented in a fixed order (stimuli described below), so that each participant made ratings of one career-type in each of the four within-subjects cells of the design, but ratings were collected on a total of 20 careers across the sample. For each of the four careers, participants first saw a pie chart displaying the gender distribution within the career based on occupational data from the US Bureau of Labor Force Statistics (2010). After each chart, participants rated the career on a number of characteristics described in the next section. After repeating this process for all four careers, participants completed a measure of traditional gender role attitudes, and a standard demographic questionnaire.

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[4] Participants who did not identify as male or female were excluded from analyses using gender as a predictor.

[5] For the sake of parsimony, we focused our analyses below only on the results for white-collar careers which are more similar to the careers rated in Studies 1, 3, and 4. Results for blue-collar careers were quite similar to those for white-collar careers, however, and can be found in the SOM.

9.1.2.1. Career stimuli.
The career stimuli were chosen so that, within status condition (blue- vs. white-collar), each male-dominated career was matched by a female-dominated career with a similarly extreme level of gender distribution (e.g., 15% female in one career vs. 15% male in the other). Although it was not possible to match careers on salary, we made an effort to find careers with approximately similar salaries (See Table 3; note salary information was not displayed to participants). Study 4 will more directly deal with salary as a confound.

9.1.3. Measures

9.1.3.1. Manipulation checks.
Participants rated the *gender distribution* of the career they saw on a 5-point scale ranging from 1 (*there are many more women than men*) to 5 (*there are many more men than women*). They also rated the *perceived status* of a given career on two statements (*r*s ranged from 0.34 to 0.52): "This occupation is associated with prestige in society." and "People who work in this occupation are perceived as 'lower class' in society." (reverse scored) on a 1 (*Strongly disagree*) to 7 (*Strongly agree*) scale.

9.1.3.2. Attributions for gender imbalance.
Participants rated the extent to which they believed that each of seven factors plays a role in explaining why one gender is underrepresented in that career: lower ability, lower interest, willingness to expend time and effort, discrimination, concern over violating others' expectations, feeling out of place, and lacking role models (see SOM for exact wording). Ratings were made on a scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). We chose these items informed by a model of *internal* and *external* factors thought to predict the underrepresentation of men in communal roles (Croft et al., 2015). In an effort to reduce the data for analysis into broader categories of attribution, we conducted a pair of exploratory maximum likelihood factor analyses with oblimin rotation on these seven items to examine whether these items fit the expected "internal attributions" vs. "external attributions" factor structure (one analysis for each white-collar career type, see SOM for details). For female-dominated careers, this factor analysis yielded a three-factor solution assessing *ability*, *motivation*, and *prohibitive norms* with each factor explaining ~18% of the variance in responses. For male-dominated careers, the analysis yielded a two-factor solution (*ability* and *motivation* loaded together on one factor explaining 22% of the variance, and *norms* explaining an additional 15%). To allow for consistency in analyses across career-type, we created three attribution composites: *Attribution to lack of motivation* (lower interest, being unwilling to devote time and effort, *r*s range from 0.26 to 0.39), *attribution to lack of ability* (a single ability item), *attribution to prohibitive norms* (discrimination, lack of role models, violating others' expectation, and feeling out of place, *range of* αs = 0.50 to 0.70).

9.1.3.3. Support for social action.
Participants' support for social action towards changing gender imbalance in a given career was assessed with two items ("To what degree do you think there should be educational programs put in place to promote greater gender equality in this occupation?" and "To what degree do you think this occupation should be trying to recruit members of the underrepresented gender into this field?") on a scale of 1 (*Not at all necessary*) to 7 (*Extremely necessary*). Ratings on these two questions were averaged to represent our key dependent variable for each career (*r*s range from 0.80 to 0.87).

9.1.3.4. Traditional gender role attitudes.
To assess the extent to which participants endorsed traditional gender roles attitudes, they completed the 20-item Traditional Egalitarian Sex Role Scale (α = 0.93, Larsen & Long, 1988; e.g., "A woman's place is in the home.", "The belief that women cannot make as good supervisors or executives as men is a myth.") rated on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*).

9.1.3.5. Demographics.
Lastly, participants reported demographics including *gender*, *age* (self-reported in years), their highest level of

Table 3
Career stimuli in order of presentation for different sets in study 2.

	1	2	3	4
Set 1	Hosts/hostess (BCF) $363/wk	Taxi driver (BCM) $591/wk	Registered nurse (WCF) $1035/wk	Computer-related fields (WCM) $1182/wk
Set 2	Architectural managers (WCM) $1311/wk	Librarian (WCF) $948/wk	Police officer (BCM) $1176/wk	Financial clerks (BCF) $516/wk
Set 3	Supervisors of production (BCM) $1160/wk	Social workers (WCF) $774/wk	Cashiers (BCF) $361/wk	Civil engineers (WCM) $1438/wk
Set 4	Elementary school teachers (WCF) $641/wk	Production workers (BCM) $573/wk	Hairdressers (BCF) $406/wk	Dentists (WCM) $1228/wk
Set 5	Maids (BCF) $371/wk	Chief executive officers (WCM) $2836/wk	Maintenance/repair workers (BCM) $788/wk	Healthcare (WCF) $430/wk

Notes. BCF- Blue-collar female-overrepresentation, BCM – Blue-collar male-overrepresentation, WCF – White-collar female-overrepresentation, WCM – White-collar male-overrepresentation. Each participant saw one of the five sets of careers (without salary information), containing each career-type once. Only data from white collar careers is summarized in the paper; data for blue-collar careers is in SOM.

education (on a 7-point scale where 1 = some high school or less, and 7 = Graduate/professional degree), annual *household income* (on a 12-point scale where 1 = $0–$4999 and 12 = Over $200.000), and *political orientation* (on a 7-point scale where 1 = extremely liberal and 7 = extremely conservative) but also sexuality, ethnicity, marital status, number of children. A full list of additional exploratory variables can be found in the SOM.

9.2. Results and discussion

Means and standard errors for all main variables in this study are summarized in Table 4.

9.2.1. Manipulation check
To examine whether our within-subjects manipulation of gender-distribution was perceived in the intended way, we first conducted a paired-samples t-test comparing ratings of gender imbalance for male- and female-dominated careers. As expected, female-dominated careers were rated as having significantly more women ($M = 4.79$, $SD = 0.62$) than male-dominated careers ($M = 1.19$, $SD = 0.61$), $t(246) = 63.26$, $p < .001$, $d = 5.85$, CI$_{.95}$ (5.84, 6.25).

9.2.2. Testing the asymmetry in support for social action
To test whether Study 2 replicated the asymmetry in support for social action from Study 1, we conducted a paired-samples t-test comparing ratings of support for social action for male- and female-dominated careers. As in Study 1, results suggested that people showed greater support for social action towards changing the imbalance in male-dominated, as compared to female-dominated careers, $t(251) = 5.12$, $p < .001$, $d = 0.32$, CI$_{.95}$ (0.19, 0.45).

9.2.3. Testing discrepancies in status and attributions for imbalance
9.2.3.1. *Perceived status.* We conducted a parallel paired-samples t-test to examine perceptions of career-status for male- vs. female dominated careers. Results showed that, as expected, male-dominated careers were perceived as significantly higher in status than female-dominated careers, $t(251) = 12.17$, $p < .001$, $d = 0.32$, CI$_{.95}$ (0.16, 0.48), see Table 4.

9.2.3.2. *Attributions for imbalance.* We next examined the attributions people made for gender imbalances for the different types of careers. We conducted a 2 (*Career-Type*: male- vs. female- dominated) × 3 (*Attribution*: motivation vs. prohibitive norms vs. ability) within-subjects analysis of variance. Means and standard deviations for these variables by career-type, as well as results from Bonferroni corrected pairwise comparisons are displayed in Table 4. These analyses yielded a significant interaction between Attribution and Career-type, F (2, 247) = 20.85, $p < .001$, $\eta_p^2 = 0.14$. First, we compared the relative weight given to different attributions *within* each career-type. For male-dominated careers, participants attributed women's underrepresentation more to prohibitive norms than to women's lack of motivation or ability. In contrast, for female-dominated careers, participants attributed the men's underrepresentation to both prohibitive norms and men's lack of motivation (with motivation rated as marginally higher than norms, $p = .082$), more than to men's lack of ability.

Second, we also conducted comparisons within each attribution type between female- and male-dominated careers. As predicted, pairwise (Bonferroni corrected) comparisons revealed that a lack of motivation was perceived as a more important factor in preventing men from entering female-dominated careers than in preventing women from entering male-dominated careers. Prohibitive norms were perceived as equally important in explaining the gender imbalance in both male- and female-dominated careers. In addition, lack of ability was perceived as a more important factor for women's underrepresentation in male-dominated careers than for men's underrepresentation in female-dominated careers.

Table 4
Study 2: Means and standard deviations for key variables (as well as difference scores).

	Male-dominated M (SD)	Female-dominated M (SD)	Discrepancy/asymmetry M (SD)
Social action support	4.89 (1.69)	4.34 (1.67)	0.55 (1.71)
Perceived career status	5.93 (1.05)	4.80 (1.29)	1.13 (1.47)
Attributions			
Prohibitive norms	3.87$_{c,a}$(1.06)	3.84$_{b,a}$ (1.27)	0.03 (1.35)
Lack of motivation	3.58$_{b,a}$ (1.64)	4.09$_{b,b}$ (1.60)	−0.51 (1.77)
Lack of ability	2.46$_{a,a}$ (1.65)	2.15$_{a,b}$ (1.52)	0.31 (1.87)

Notes. Bonferroni corrected comparisons within the attributions are marked by subscripts. Within each column, means that share the first subscript in common do not differ significantly at $p < .05$. Within each row, means that share the second subscript in common do not differ significantly at $p < .05$. All Scales ranged from 1 to 7.

Table 5
Study 2 Regression model predicting participants' asymmetry in support for social action in male-dominated vs. female-dominated careers (white collar only).

Coefficients	Step 1				Step 2				Step 3			
	Beta	CI.95	SE	p	Beta	CI.95	SE	p	Beta	CI.95	SE	p
Gender	0.09	−0.16–0.35	0.13	0.472	0.13	−0.12–0.39	0.13	0.306	0.03	−0.21–0.27	0.12	0.820
Age	−0.05	−0.18–0.08	0.07	0.447	−0.04	−0.16–0.09	0.06	0.568	−0.08	−0.20–0.04	0.06	0.202
Education	0.13	−0.00–0.25	0.06	0.051	0.10	−0.03–0.22	0.06	0.132	0.13	0.01–0.25	0.06	0.029
Income	−0.04	−0.17–0.09	0.07	0.566	−0.05	−0.18–0.08	0.06	0.421	−0.06	−0.18–0.06	0.06	0.308
Political conservatism	0.02	−0.12–0.16	0.07	0.766	0.01	−0.13–0.15	0.07	0.902	0.01	−0.12–0.15	0.07	0.839
TGRA	−0.26	−0.40 to −0.11	0.07	< 0.001	−0.22	−0.37 to −0.08	0.07	0.002	−0.19	−0.33 to −0.06	0.07	0.005
Status discrepancy					0.17	0.04–0.30	0.06	0.009	0.11	−0.01–0.23	0.06	0.070
Ability discrepancy									−0.10	−0.24–0.03	0.07	0.119
Motivation discrepancy									−0.18	−0.30 to −0.05	0.06	0.007
Norm discrepancy									0.34	0.22–0.45	0.06	< 0.001
Observations	241				241				238			
R²/adj. R²	0.089/0.066				0.115/0.089				0.261/0.229			

Notes. Discrepancy variables are coded so higher numbers indicate higher ratings given to male-dominated as compared to female-dominated careers. Higher ratings on the outcome variable thus suggest more support for action towards change in male- as compared to female-dominated careers. Gender coded male = 0 and female = 1. TGRA = Traditional Gender Role Attitudes.

9.2.4. How do status and attributions predict the asymmetry in support for social action?

The above analyses suggest that both the presence of external barriers and a lack of motivation are seen as core reasons for the gender imbalance in careers. We next tested whether these different attributions for gender imbalances in male- and female-dominated careers independently predicted the extent to which people supported social action towards change. Given the within-subjects design, we created a series of difference score variables to capture discrepancies in perception for male- and female-dominated careers for each attribution type (i.e., *discrepancy in norms, motivation, and ability*) and, as in Study 1, for support for social action (i.e., *asymmetry in support for social action*). Means and standard deviations for these difference scores are summarized in Table 4. Higher difference scores always indicate relatively higher ratings for male-dominated compared to female-dominated careers. We then regressed asymmetry in support for social action onto age, gender, income, education, political conservatism, and traditional gender role attitudes as predictors on Step 1, discrepancy in perceived career-status on Step 2, and all three attribution discrepancy scores (discrepancy in lack of ability, discrepancy in lack of motivation, and discrepancy in norms) as predictors on Step 3 of a linear regression model. All predictors (except gender) were standardized.

Results from these analyses (summarized in Table 5), suggested that, controlling for demographics and traditional gender role attitudes (which actually predicted *less* asymmetric support for social change), the extent to which people saw male-dominated careers as higher in status than female-dominated careers predicted higher asymmetry in support for social action (i.e., more support in male- vs. female-dominated careers). This effect, however, was not significant after entering the three attributional discrepancy scores into the model. Results from Step 3 of the model revealed that people supported more action towards change in male-dominated (relative to female-dominated) careers to the extent that they: a) believed prohibitive norms are *more* of a problem in restricting women's rather than men's entry into careers, and b) believed that a lack of motivation is more important in preventing men rather than women's entry into gender atypical careers.[6]

9.2.5. Do discrepancies in attributions mediate the relationship between status and support for social action?

Given the results of the above regression analyses, we next sought to test whether status-discrepancies predicted asymmetry in support for social action *as mediated by* the discrepant attributions people made for male- vs. female-dominated careers. We conducted exploratory mediation analyses using the lavaan package in R (Rosseel, 2012) in which we entered participants' status-discrepancy score as the main predictor of asymmetry in support for social action and all three attribution discrepancy scores (lack of motivation, prohibitive norms, and lack of ability) as simultaneous mediators in one model. The a- and b-paths of this model controlled for the same variables as in the above regression analysis.

Results (displayed in Fig. 2) revealed significant indirect effects of status discrepancies on the asymmetry in support for social action via perceived discrepancy in motivation, $a*b_{motivation} = 0.03$, $SE = 0.02$, $z = 2.05$, $p = .041$, $CI_{.95}(0.001, 0.07)$, but not through norms, $a*b_{norms} = 0.03$, $SE = 0.02$, z = 1.13, $p = .261$, $CI_{.95}(-0.02, 0.07)$, or ability, $a*b_{ability} = -0.002$, $SE = 0.01$, z = −0.28, $p = .777$, $CI_{.95}(-0.02, 0.01)$. More specifically, the extent to which participants saw female-dominated careers as lower in status than male-dominated careers predicted seeing a lack of motivation as more explanatory for the gender imbalance in female-dominated than in male-dominated careers. This tendency to blame men's underrepresentation (relative to women's underrepresentation) more on a lack of motivation, in turn, predicted participants' lower tendency to support social action to create balance in female-dominated compared to male-dominated careers.

Taken together, results from Study 2 conceptually replicated Study 1's finding that people are more supportive of addressing women's underrepresentation in male-dominated rather than men's underrepresentation in female-dominated careers. Furthermore, Study 2 provided preliminary evidence for different lay attributions made for gender imbalances in male- vs. female-dominated careers. Results suggested that people believe that gender imbalances in male-dominated careers stem more from prohibitive norms, rather than from a lack of motivation. Conversely, men's lack of motivation and prohibitive norms are both seen as key factors for men's underrepresentation in female-dominated fields. Moreover, Study 2 provides first evidence that a tendency to attribute male- (vs. female-) overrepresentation more to norms but less to motivation might partly explain why (most) people are less inclined to support social action aimed at rectifying men's underrepresentation in HEED fields like nursing and education compared to rectifying women's underrepresentation in fields like STEM and leadership. The tendency to see these female-dominated careers as having relatively lower status (which is partly indicated by lower

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[6] Results are similar in separate regression models for male-dominated and female-dominated careers. The only notable difference is that perceived status significantly predicts support for social action in female-dominated careers, $\beta = 0.18$, $SE = 0.06$, $t (229) = 2.81$, $p = .005$, $CI_{.95} (0.05, 0.30)$, but not for male-dominated careers, $\beta = 0.09$, $SE = 0.06$, $t (228) = 1.61$, $p = .108$, $CI_{.95} (-0.02, 0.21)$.
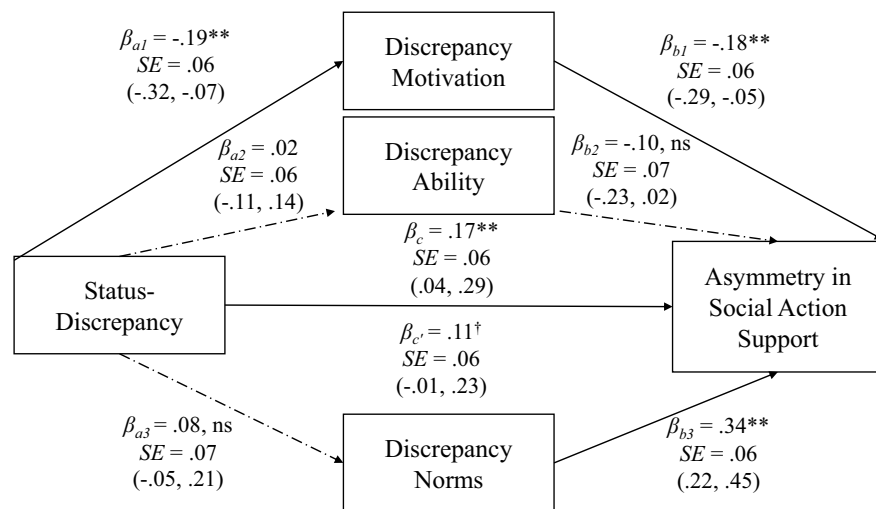
Fig. 2. Study 2 mediation analyses predicting asymmetry in social action support.
Note. $^\dagger p < .10$, $^{**}p < .01$, $CI_{.95}$ in parentheses.

salary) predicts the belief that men are less motivated to pursue these careers, an attribution that predicts people's relatively lower interest in efforts to change this status quo.

While these findings further suggest that gender imbalances are perceived very differently based on whether they concern male- or female-underrepresentation, Study 2 had several limitations. First, our attributional measures were admittedly exploratory. For Study 3 we thus created and pilot tested a more balanced pool of items to assess attributions to ability, motivation, and prohibitive norms specifically (see detailed list of items piloted in SOM). Second, analyses in Study 2 yielded an intriguing indirect effect consistent with a status value theory explanation for the findings. That is, the asymmetry in support for social action was predicted by the perceived status differences in these careers (which is partly a function of salary differences) as mediated by differential attributions for gender imbalances. We sought to replicate these indirect effects in Study 3, but without drawing explicit attention to the salaries these careers earn. Third, to increase the reliability of participants' career ratings in Study 3, participants viewed graphs and rated their perceptions of eight (four female-dominated and four male-dominated) careers. One final change in Study 3 was to add an additional measure of support for social action that asked participants to allocate funding to initiatives aimed at recruiting women into male-dominated fields as compared to initiatives aimed at recruiting more men into female-dominated fields.

10. Study 3

Guided by the preliminary findings from Study 2, we pre-registered all methods, hypotheses, and statistical models for Study 3 in detail on the OSF (https://osf.io/xu87y/?view_only=6adcaf459bfe4ca09a86837bc1415fd2; all analyses and exclusions were as preregistered unless otherwise noted). Specifically, we hypothesized that: 1) people would be more supportive of actions to promote gender balance in male-dominated than in female-dominated careers, 2) that they would distribute more money to initiatives that combat gender inequality in male-dominated rather than in female-dominated occupations, and 3) that people would attribute gender imbalances in female-dominated careers to men's lack of motivation more than they attribute women's underrepresentation in STEM to women's lack of motivation. 4) We also expected that this discrepancy in attributions to motivation would predict a similar discrepancy in participants' support for social action in these two types of careers; i.e., the more people attributed female-overrepresentation (vs. male-overrepresentation) to lack of motivations, the less they would support social action to change female-overrepresentation (as compared to male-overrepresentation).

10.1. Method

10.1.1. Participants

We sought to recruit 350 participants from Amazon's Mechanical Turk to be paid $3 to complete a study on "how people understand and interpret demographic trends." Power analyses using G*power (see pre-registration) suggested we needed at least 293 participants to have 85% power to replicate our most central effects from Study 2 – the significant regression coefficients for the relationships between discrepancy in motivation ($\beta = 0.18$) and prohibitive norms ($\beta = 0.34$) predicting the asymmetry in social action between male- and female-dominated careers. Sample size was determined before any data collection and analyses. Participants were eligible for the study if they were located in the U.S. and had a HIT approval rate of at least 0.95. Although 350 workers were requested, 355 actually completed the study. We excluded 26 participants who failed at least one of our attention checks, resulting in final sample of 329 (178 women/ 149 men/ 2 other gender identities[7]). The majority of participants identified as White (73%), with a significant minority identifying as Black (11%), Latino (6%), or of mixed ethnicity (3%).

10.1.2. Procedure

For Study 3, our procedure was a hybrid of the prior two studies. After providing informed consent, participants made ratings of four male-dominated and four female-dominated careers (selected to be matched on percentage of gender imbalance based on Bureau of Labor Statistics, 2011; see Table 6). For each of these careers, participants first rated perceived status and estimated salary (to avoid drawing attention to salary differences that are confounded with career-type, actual salary information was not provided to them with the chart). As in Study 2, they then saw a pie chart showing the actual gender distribution in that career and were asked to report the gender distribution they had seen. Participants next completed the attributions measures and indicated their support for social action for that career. After repeating this procedure for each of the eight careers (in random order), participants completed measures of budget allocation, traditional gender role attitudes, and demographics.

10.1.3. Measures
10.1.3.1. Perceived salary and status. To measure the perceived status of

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[7] Note that the two participants with other gender identities were excluded from analyses using gender as a variable so that gender could be dummy coded.

Table 6
Gender distribution in careers represented in study 3 according to bureau of labor statistics.

Selected careers	% Women	% Men
Male-dominated career average	17.88	82.12
Computer programmer	22.6	77.4
Civil engineer	10.8	89.2
Electrical engineer	10.8	89.2
Chief executive officer (CEO)	27.3	72.7
Female-dominated career average	82.93	17.07
Social worker	81.5	18.5
Registered nurse	90	10
Elementary school teacher	86	14
Human resource manager	74.2	25.8

Note. Statistics taken from Bureau of Labor Statistics (2011) https://www.bls.gov/cps/cpsaat11.htm

female- and male-dominated careers, each of the eight careers was rated on two items ("Compared to other occupations in the United States, how well-paid is this occupation?"; "This occupation is perceived as having "high status" (i.e., seen as a good, highly educated job, with high prestige) in society," on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Although we had preregistered a plan to analyze perceived status and salary separately, these items were highly correlated ($rs > 0.70$) and yielded parallel results. Thus, they were averaged for the four female-dominated ($\alpha = 0.83$) and male-dominated careers ($\alpha = 0.79$) to represent overall *status* perceptions for each career-type.

10.1.3.2. Manipulation check. To assess the extent to which participants correctly perceived the gender distribution they saw, participants completed the same gender imbalance measure as in Study 2 for each career.

10.1.3.3. Attributions. With the aim to create more reliable measures of the three attribution factors (prohibitive norms, lack of motivation, lack of ability) found in Study 2, we created and pilot tested a larger pool of 12 items to represent each attributional category. With a separate sample 92 Amazon Mechanical Turk workers, we conducted a pair of exploratory maximum likelihood factor analyses with oblimin rotation on these 12 items separately for male- and female-dominated careers. Results of these preliminary pilot analyses yielded a three-factor solution for both career-types. On the basis of these analyses, we selected two items to represent *lack of motivation*, two items to represent *lack of ability*, and four items to represent *prohibitive norms*. See SOM for a table of factor loadings in the pilot study and Table 7 for scale

reliabilities of the selected items measured in the current sample. For each career, participants in the current sample rated these eight attribution items on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Items were randomized as groups of attributions (i.e., the items within attribution categories were presented together, but in random order).

10.1.3.4. Support for social action. Two slightly reworded items ("Policies and/or programs should be put in place to encourage men [women] to go into [career]"; "Efforts should be made to actively recruit men [women] into [career].") assessed the extent to which participants supported social action towards change for each career. These were rated on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Items were averaged within career-type to represent support for social action female-dominated ($\alpha = 0.95$) and male-dominated careers ($\alpha = 0.97$).

10.1.3.5. Funding allocation. As an additional measure of social action, participants were asked to imagine how they would distribute funding from the state government of Michigan to nine different programs for school-aged kids (see Appendix A). As pre-registered, our main focus was on the *funding allocation towards change in female-dominated careers* (sum of percentage given to the two initiatives targeting female-overrepresentation; $r = 0.61$) and *funding allocation towards change in male-dominated careers* (sum of percentage given to the two initiatives targeting male-overrepresentation; $r = 0.46$), and their difference score (referred to as *asymmetry in funding allocation*).

10.1.3.6. Traditional gender role attitudes. Traditional gender role attitudes were measured with a subset of seven items (e.g., "Ultimately a woman should submit to her husband's decision.", see SOM for list of selected items) from the Larsen and Long (1988) scale used in Study 2 ($\alpha = 0.94$), rated on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly Agree*).

10.1.3.7. Demographics. Participants self-reported their gender, age, income, education, political orientation, and subjective SES to be included as covariates in analyses. In addition, participants self-reported sexual orientation, ethnicity, and number of children.

10.1.3.8. Attention checks. Two attention checks (e.g., "If you are reading this statement closely, please select option three on the scale.") were embedded in the ratings participants had to make. As a third attention check, we also asked participants to report the extent to which they paid attention in the session.

Table 7
Study 3: Attribution items and Chronbach's alpha scale reliabilities.

	Scale items	α Male-dominated	α Female-dominated
Ability attributions			
	1. There are fewer men [women] in this occupation because they lack the ability to do this kind of job.	0.95	0.92
	2. There are fewer men [women] in this occupation because they have less of the skill-sets needed to succeed in this field.		
Norm attributions			
	1. There are fewer men [women] in this occupation because there are no other men [women] providing role models in this profession.	0.93	0.92
	2. There are fewer men [women] in this occupation because they experience discrimination by others who feel they should not be in this profession.		
	3. There are fewer men [women] in this occupation because they would be negatively evaluated for being in the occupation.		
	4. Men [women] do not enter this field because the number of other [men] in the field is so low.		
Motivational attributions			
	1. There are fewer men [women] in this occupation because they are not interested in this type of work.	0.93	0.92
	2. There are fewer men [women] in this occupation because they do not find this type of work engaging.		

Table 8
Study 3: Means (SDs) for key variables.

	Male-dominated	Female-dominated	Discrepancy/asymmetry scores
Social action support	5.17 (1.60)	4.49 (1.61)	0.69 (1.15)
Funding allocation	27.82 (14.92)	18.92 (9.86)	8.91 (16.65)
Perceived career status	5.80 (0.61)	3.92 (0.79)	1.88 (0.79)
Attributions			
Prohibitive norms	4.06$_{b,a}$ (1.31)	3.54$_{c,b}$ (1.19)	0.51 (1.03)
Lack of motivation	3.77$_{b,a}$ (1.61)	4.85$_{b,b}$ (1.37)	−1.07 (1.31)
Lack of ability	2.33$_{a,a}$ (1.50)	2.91$_{a,b}$ (1.14)	−0.57 (1.13)

Notes. Bonferroni corrected comparisons are reported for attributions: Within each column (i.e., comparing reasons within career-type), means that share the first subscript in common do not differ significantly at $p < .05$. Within each row (i.e., comparing career-types within attribution), means that share the second subscript in common do not differ significantly at $p < .05$. Funding allocation was out of a total of 100 distributed among the 3 different categories (male-dominated, female-dominated, filler). All other scales ranged from 1 to 7.

10.2. Results and discussion

Means and standard errors for all main variables in this study are summarized in Table 8.

10.2.1. Manipulation check

Participants accurately perceived the gender distributions in the pie charts. Female-dominated careers were reported as having more women ($M = 4.85$, $SD = 0.32$) than male-dominated careers ($M = 1.20$, $SD = 0.49$), $t(328) = −98.79$, $p < .001$, $d = −5.45$, CI$_{.95}$ (−5.78, −5.11).

10.2.2. Testing the asymmetry in support for social action

We next tested the asymmetry in social action hypothesis both on the self-report and the funding measures. Replicating the findings from the earlier two studies, a paired-sample *t*-test revealed that participants reported more support for social action for male-dominated than female-dominated careers, $t(328) = 10.82$, $p < .001$, $d = 0.60$, CI$_{.95}$ (0.44, 0.75). The same pattern was significant and similarly large in magnitude on the funding measure: participants allocated more funding to recruit women into male-dominated careers than to recruit men into female-dominated careers, $t(328) = 9.70$, $p < .001$, $d = 0.53$, CI$_{.95}$ (0.38, 0.69).

10.2.3. Testing discrepancies in status and attributions for imbalance
10.2.3.1. Perceived status.
We conducted a parallel paired-samples t-test to examine perceptions of career-status for male- vs. female-dominated careers. Results showed that, as expected, male-dominated careers were perceived as significantly higher in status/salary than female-dominated careers, $t(328) = 43.23$, $p < .001$, $d = 2.38$, CI$_{.95}$ (2.18, 2.58).

10.2.3.2. Attributions for imbalance.
As in Study 2, we examined the attributions made for gender imbalances with a 2 between (*Career-Type*: male- vs. female-dominated) x 3 within (*Attribution*: motivation vs. prohibitive norms vs. ability) mixed ANOVA. Results from Bonferroni-corrected pairwise comparisons are displayed in Table 8. Results supported the pre-registered Attribution by Career-Type interaction, F (2, 324) = 113.26, $p < .001$, $\eta_p^2 = 0.41$. Participants attributed the underrepresentation of women in male-dominated careers less to ability than to a lack of motivation and to prohibitive norms, which did not differ significantly from each other. Importantly, and as expected, participants attributed the underrepresentation of men in female-dominated careers significantly more to lack of motivation than to prohibitive norms, which they saw as a larger causal factor than ability.

Most notably, and as predicted, a lack of motivation (and ability) was perceived as a more important factor in preventing men from entering female-dominated careers than for women entering male-dominated careers. In contrast, prohibitive norms were perceived as a significantly more important contributor to the imbalance in male-dominated than in female-dominated fields.

How Do Status and Attributions Predict the Asymmetry in Support for Social Action?

To examine how these differential attributions predicted the asymmetry in social action, we again created discrepancy scores as in Studies 1 and 2 (male-dominated minus female-dominated) of support for action, all attributions, as well as status/salary perceptions and the new funding allocation measure. We then regressed asymmetry in support for social action (our main outcome) onto age, gender, income, education, SES, political conservatism, traditional gender role attitudes as predictors on Step 1, perceived status-discrepancy as a predictor on Step 2, and all three attribution-discrepancy scores (i.e., *discrepancy in norms, motivation, and ability*) as predictors on Step 3 of a linear regression model.[8] All predictors except gender were standardized and results are summarized in Table 9.

Results revealed that, even when controlling for a variety of participant characteristics that we had pre-registered as covariates, the discrepancy score for career-status was positively related to an asymmetry in support for social action on Step 2 of the regression model. This effect of perceived status discrepancy was also significant on Step 3. Most importantly, as we had pre-registered and replicating Study 2, people reported being more supportive of action towards change in male- than female-dominated careers to the extent that they attributed gender imbalances in male-dominated careers more to prohibitive external norms and less to a lack of motivation.

We repeated these analyses with discrepancy in funding allocation as our new outcome measure (see Table 10). On this measure of funding allocations, participants allocated fewer funds to desegregate female-compared to male-dominated careers to the extent that they saw male-dominated fields as having higher status than female-dominated fields, and to the extent that they attributed the gender imbalance in these careers more to men's inherent lack of motivation for these jobs.[9]

10.2.4. Do discrepancies in attributions mediate the relationship between status and support for social action?

As in Study 2, we sought to examine whether discrepancies in attributions mediated the relationship between perceived status-discrepancies and asymmetry in support for social action, as well as the relationship between perceived status-discrepancies and asymmetry in funding allocation. We tested these hypotheses with mediation analyses in the SEM framework using the lavaan package in R (Rosseel, 2012). As in Study 2, we entered participants' status-discrepancy score as the main predictor of asymmetry in support for social action, and all three attribution discrepancy scores (lack of motivation, prohibitive norms, and lack of ability) as simultaneous mediators in one model. Both a- and b-paths controlled for the same variables in the above regression models (meaning, compared to Study 2, participant SES was now also control variable) and all variables (except gender) were standardized. These mediation models are visualized in Figs. 3 and 4.

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[8] Note that we pre-registered only step 3 of the model, but we thought it was informative to show these steps separately and conclusions are not changed by this presentation of results.

[9] Results are similar in separate regression models for male-dominated and female-dominated careers. The only notable difference is that perceived status significantly predicts support for social action and funding assigned to programs in female-dominated careers, $\beta = 0.17$, $SE = 0.05$, $t(313) = 3.23$, $p = .001$, CI$_{.95}$ (0.07, 0.27), and $\beta = 0.20$, $SE = 0.06$, $t(313) = 3.55$, $p < .001$, CI$_{.95}$ (0.09, 0.31) respectively, but not for male-dominated careers, $\beta = 0.01$, $SE = 0.05$, $t(313) = 1.09$, $p = .276$, CI$_{.95}$ (−0.04, 0.17), and $\beta = −0.04$, $SE = 0.06$, $t(313) = −0.65$, $p = .515$, CI$_{.95}$ (−0.15, 0.07) respectively.

Table 9
Study 3 Regression Model predicting participants' asymmetry in support for male- vs. female-dominated careers.

	Step 1				Step 2				Step 3			
	Beta	CI.$_{95}$	SE	p	Beta	CI.$_{95}$	SE	p	Beta	CI.$_{95}$	SE	p
Gender	0.03	−0.19–0.25	0.11	0.808	−0.04	−0.25–0.17	0.11	0.727	−0.14	−0.34–0.06	0.10	0.167
Age	−0.06	−0.17–0.05	0.05	0.292	−0.05	−0.15–0.05	0.05	0.340	−0.09	−0.19–0.01	0.05	0.064
Education	0.04	−0.08–0.16	0.06	0.524	0.01	−0.11–0.12	0.06	0.887	0.01	−0.09–0.12	0.05	0.810
Income	0.03	−0.10–0.16	0.07	0.664	−0.00	−0.13–0.12	0.06	0.950	−0.01	−0.12–0.11	0.06	0.917
SES	−0.06	−0.19–0.08	0.07	0.407	0.00	−0.13–0.13	0.07	0.979	0.02	−0.10–0.14	0.06	0.745
Political conservatism	−0.08	−0.21–0.04	0.06	0.206	−0.08	−0.20–0.04	0.06	0.170	−0.03	−0.14–0.08	0.06	0.618
TGRA	**−0.21**	**−0.34 to −0.08**	**0.07**	**0.002**	−0.13	−0.26–0.00	0.07	0.055	−0.05	−0.17–0.08	0.06	0.460
Status discrepancy					**0.32**	**0.21–0.43**	**0.06**	**< 0.001**	0.22	0.12–0.33	0.05	< 0.001
Ability discrepancy									**−0.11**	**−0.22 to −0.01**	**0.05**	**0.040**
Motivation discrepancy									**−0.16**	**−0.27 to −0.05**	**0.06**	**0.004**
Norm discrepancy									**0.28**	**0.18–0.39**	**0.05**	**< 0.001**
Observations	325				325				325			
R^2/adj. R^2	0.084/0.064				0.172/0.151				0.309/0.285			

Notes. Discrepancy variables are coded so higher numbers indicate higher ratings given to male-dominated as compared to female-dominated careers. Higher ratings on the outcome variable thus suggest more support for action towards change in male- as compared to female-dominated careers. Gender coded male = 0 and female = 1. TGRA = Traditional Gender Role Attitudes.

Table 10
Study 3 Regression model predicting participants' asymmetry in funding for male- vs. female-dominated careers.

	Step 1				Step 2				Step 3			
	Beta	CI.$_{95}$	SE	p	Beta	CI.$_{95}$	SE	p	Beta	CI.$_{95}$	SE	p
Gender	−0.25	−0.48 to −0.03	0.11	0.027	−0.29	−0.52 to −0.07	0.11	0.009	−0.34	−0.57 to −0.12	0.11	0.002
Age	0.04	−0.07–0.15	0.06	0.488	0.04	−0.06–0.15	0.05	0.427	0.01	−0.10–0.11	0.05	0.899
Education	−0.04	−0.16–0.08	0.06	0.551	−0.06	−0.17–0.06	0.06	0.361	−0.07	−0.19–0.05	0.06	0.251
Income	−0.04	−0.18–0.09	0.07	0.512	−0.07	−0.20–0.07	0.07	0.332	−0.07	−0.20–0.06	0.07	0.306
SES	0.09	−0.05–0.23	0.07	0.193	0.13	−0.01–0.26	0.07	0.067	0.14	0.00–0.27	0.07	0.045
Political conservatism	−0.13	−0.26 to −0.01	0.06	0.038	−0.14	−0.26–0.01	0.06	0.032	−0.11	−0.23–0.02	0.06	0.088
TGRA	−0.12	−0.26–0.01	0.07	0.071	−0.07	−0.20–0.07	0.07	0.315	−0.02	−0.16–0.12	0.07	0.821
Status discrepancy					**0.20**	**0.08–0.31**	**0.06**	**< 0.001**	0.14	0.03–0.26	0.06	0.017
Ability discrepancy									**−0.03**	**−0.15–0.09**	**0.06**	**0.594**
Motivation discrepancy									**−0.19**	**−0.31 to −0.06**	**0.06**	**0.003**
Norm discrepancy									0.09	−0.02–0.21	0.06	0.120
Observations	325				325				325			
R^2/adj. R^2	0.054/0.033				0.088/0.065				0.134/0.104			

Notes. Discrepancy variables are coded so higher numbers indicate higher ratings given to male-dominated as compared to female-dominated careers. Higher ratings on the outcome variable thus suggest desired funding towards change in male- as compared to female-dominated careers. Gender coded male = 0 and female = 1. TGRA = Traditional Gender Role Attitudes.
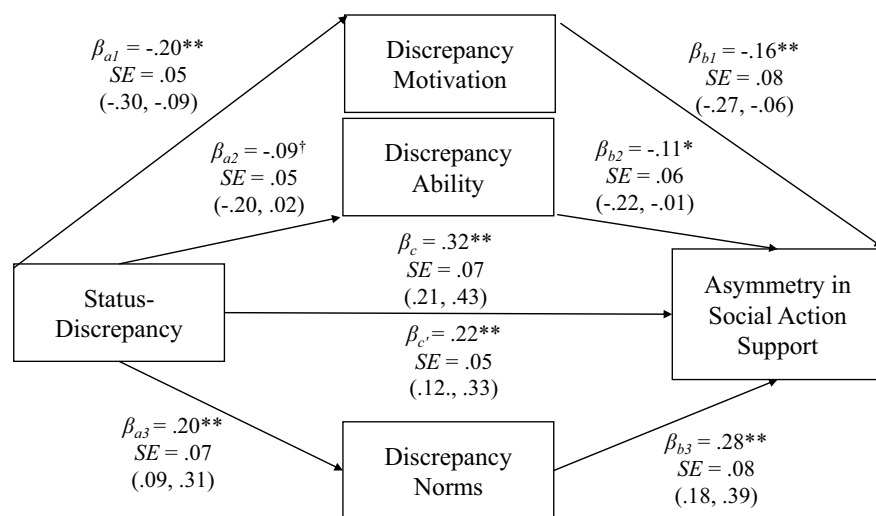

Fig. 3. Study 3 Mediation analyses predicting asymmetry in social action support.
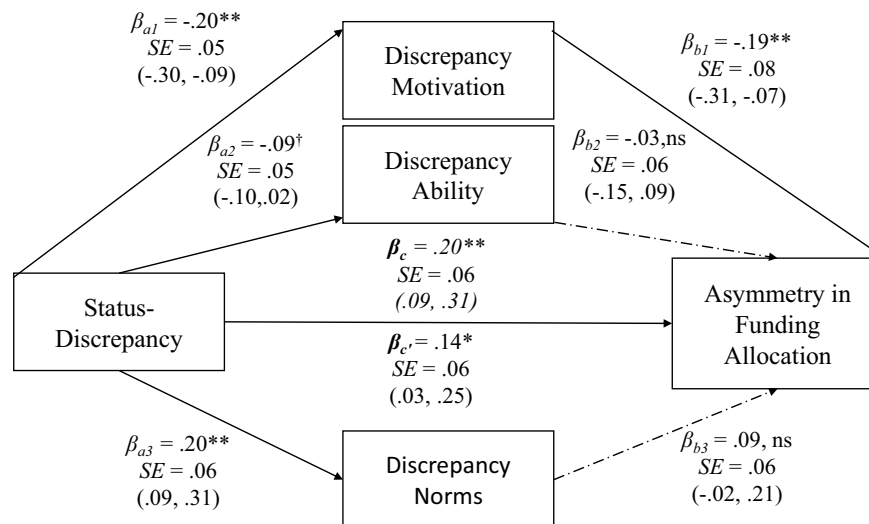Note. †p < .10, **p < .01, CI.$_{95}$ in parentheses.

Fig. 4. Study 3 Mediation analyses predicting asymmetry in funding allocation.
Note. $^{\dagger}p < .10$, $^{**}p < .01$, $CI_{.95}$ in parentheses.

Results for asymmetry in support for social action as an outcome suggested, as in Study 2, that both perceived discrepancy in motivation, $a*b = 0.03$, $SE = 0.01$, $z = 2.31$, $p = .021$, $CI_{.95}$ (0.01, 0.06), and prohibitive norms, $a*b = 0.06$, $SE = 0.02$, $z = 2.97$, $p = .003$, $CI_{.95}$ (0.02, 0.09), but not perceived discrepancy in ability, $a*b = 0.01$, $SE = 0.01$, $z = 1.31$, $p = .189$, $CI_{.95}$ (-0.01, 0.03), partially accounted for the relationship between perceived status discrepancies and the tendency to support social action more for male- than for female-dominated careers. As hypothesized, participants were more likely to perceive men's lack of motivation as explaining the imbalance in female-dominated careers, and prohibitive norms as blocking women's entry to male-dominated careers to the extent that they saw male-dominated careers as higher in status than female-dominated careers. In turn, the perception that prohibitive norms are more of a problem for women in male-dominated careers but lack of motivation is more of a problem for men in female-dominated careers predicted supporting change more for currently male-dominated, compared to currently female-dominated careers.

Results for asymmetry in funding allocation as an outcome suggested that only perceived discrepancies in motivation, $a*b = 0.04$, $SE = 0.02$, $z = 2.35$, $p = .019$, $CI_{.95}$(0.01, 0.07), but not perceived discrepancies in prohibitive norms, $a*b = 0.02$, $SE = 0.01$, $z = 1.45$, $p = .147$, $CI_{.95}$ (-0.01, 0.04), or perceived discrepancies in ability, $a*b = 0.003$, $SE = 0.01$, $z = 0.52$, $p = .605$, $CI_{.95}$(-0.01, 0.01), partially accounted for the relationship between perceived status discrepancies and the tendency to allocate more funding to promote gender balance in male- rather than female-dominated careers. Similar to the results for social action, paths showed that participants perceived a lack of motivation as more problematic in female-dominated careers to the extent that they saw female-dominated careers as lower in status than male-dominated careers. In turn, the perception that a lack of motivation is more of a problem for men in female-dominated careers, than for women in male-dominated careers predicted allocating more funding to aid the recruitment of women, rather than men, into fields in which they are currently underrepresented. Although these indirect effects are by nature correlational, they are consistent with a status value perspective.

Importantly, careers dominated by men are afforded both high status and high salary in most societies (England, Budig, & Folbre, 2002; England, Thompson, & Aman, 2001; Kilbourne, England, Farkas, Beron, & Weir, 1994), and in our own data, status and salary perceptions were so highly related that we could not justify analyzing them separately. Theoretically, however, status does not have to be equal to

salary, and salary does not have to equal gender distribution (England et al., 2002). A design with hypothetical careers would enable the gender ratio and salary of careers to be manipulated independently to isolate the effect of each on perceptions of status, attributions for gender disparities, and support for social action. This was the goal of Study 4.

11. Study 4

The first three studies yielded consistent evidence of an asymmetry in support for social action towards changing gender imbalances. However, a key limitation in using truly gender-imbalanced careers is that the salary and perceived status of these careers is confounded with gender representation. The aim of Study 4 was to unconfound these variables in a between-subjects design where gender representation was manipulated orthogonally to the average salary of the career. This then provides a more stringent test of whether the asymmetry in support arises due to gender representation or due to the salary of the career. That is, are people less supportive of having men enter into female-dominated careers (as we hypothesize) or into lower paying careers (if people are focused, for example, on men as breadwinners)? Note, that we chose to manipulate salary and not status because we assume that gender representation and salary are actually two distinct predictors of the perceived status of a career. We again test whether the asymmetry in support for social change is explained by the attributions people make for the gender imbalance in these careers. Again, we preregistered our design, hypotheses, and analyses on the OSF (https://osf.io/76nht/register/5771ca429ad5a1020de2872e).

11.1. Method

11.1.1. Participants

We recruited 470 participants from Amazon's Mechanical Turk and provided $0.50 for completing a study on "attitudes and opinions towards social trends." Participants were eligible for the study if they were located in the U.S. and had a HIT approval rate of at least 0.95. We aimed to collect a target sample size of 400 observations after exclusions based on Fritz and Mackinnon's (2007) recommendations for a conservative estimate testing a mediation model of a small to medium effect size (βs of approximately 0.14 to 0.26) with 80% power. As preregistered, we excluded participants ($n = 72$) for incorrectly answering at least one of four different attention/quality checks, resulting in a final sample of 398 participants (204 women/194 men/2 non-binary).

The majority of the sample identified as White (73%), with 14% identifying as Black, 5% as Latin-American or Hispanic, and 5% as East Asian.

11.1.2. Procedure

After completing the consent form, participants viewed one of the eight career titles, alongside a brief description of the occupation: technical writer, broadcast news analyst, purchasing agent, sales manager, biological technician, museum technician, budget analyst, and labor relations specialist. These careers were selected because they are not well-known, have a fairly balanced gender distribution on the current labor market, and a median salary between approximately $40,000 and $70,000 (Bureau of Labor Statistics, 2017). We used several careers as stimuli to avoid having effects specific to one career. The information accompanying the career title and description constituted the key manipulations in a 2 (Salary) × 2 (Gender Representation) between-subjects design. Specifically, the career fact sheet described the career as either male-dominated (85% male) or female-dominated (85% female), and described the median salary as either high ($85,000) or low ($35,000). Based on this career-fact sheet, participants next reported their attributions for the gender-imbalance, support for changing the gender balance in the career they saw, and responded to three manipulation check items to examine if perceptions of salary and gender distribution (as well as perceived status) were interpreted differently across conditions. Participants subsequently completed a measure of traditional gender role attitudes, demographics, and two quality check questions.

11.1.3. Measures

Whereas the procedure described above presents the order in which measures appeared during Study 4, we describe the measures in order of importance below.

11.1.3.1. Manipulation checks.
We measured perceptions of salary and status of each career with the same items used in Study 3 ("Compared to other occupations in the United States, how well-paid is this occupation?", and "This occupation is perceived as having "high status" (i.e., seen as a good, highly educated job, with high prestige) in society," respectively). However, unlike in Study 3, we examined perceived salary and status separately. We examined the extent to which participants correctly perceived the career's gender distribution by completing a 5-point gender balance measure identical to that of Studies 2 and 3.

11.1.3.2. Attributions.
To measure participants' attributions to the gender-imbalance in the presented career, we included the identical eight attribution items used in Study 3: *lack of ability* (two items; $r = 0.80$), *lack of motivation* (two items; $r = 0.83$), and *prohibitive norms* (four items; $\alpha = 0.71$), all on a 7-point scale. As in Study 3, items within attribution categories were presented together, but randomized.

11.1.3.3. Support for social action.
To measure support for social action in the presented career, we presented the same two items used in Study 3. Items were averaged to represent support for social action ($r = 0.88$).

11.1.3.4. Traditional gender role attitudes.
As in Study 3, traditional gender role attitudes were measured with the subset of seven items ($\alpha = 0.94$) from the Larsen and Long (1988) scale.

11.1.3.5. Demographics.
Participants self-reported their gender, age, income, education, political orientation, subjective SES, self-reported sexual orientation, ethnicity, and number of children.

11.1.3.6. Attention and quality checks.
Two attention checks (e.g., "If you are reading this statement closely, please select option three on the scale.") were embedded in the ratings. We also included two further

quality checks at the end of the survey to ensure that our responses were from real participants (not bots) who are English speaking.

11.2. Results and discussion

11.2.1. Manipulation checks

A series of 2 (*Gender Distribution*; male- vs. female-dominated) × 2 (*Salary*; low vs. high) ANOVA were conducted to determine how our manipulations affected perceptions of gender-distribution, status, and salary of the rated career.

11.2.1.1. Perceived gender-distribution.
As expected, participants rated the male-dominated careers as having more men ($M = 4.96$, $SD = 0.32$) than the female-dominated careers ($M = 1.15$, $SD = 0.69$), $F(1, 394) = 4904.46$, $p < .001$, $\eta_p^2 = 0.93$. The salary manipulation had no effect on perceived gender-distribution, $F(1, 394) = 0.03$, $p = .86$, $\eta_p^2 < 0.001$, nor was there an interaction between factors, $F(1, 394) = 1.01$, $p = .32$, $\eta_p^2 = 003$.

11.2.1.2. Perceived salary.
In addition, salary was perceived to be higher in the high ($M = 5.36$, $SD = 0.99$) versus the low salary condition ($M = 3.27$, $SD = 0.1.37$), $F(1, 394) = 301.55$, $p < .001$, $\eta_p^2 = 0.43$. The gender distribution manipulation did not have a main effect, $F(1, 394) = 0.83$, $p = .36$, $\eta_p^2 = 0.002$, or interact with the salary manipulation, $F(1, 394) = 0.10$, $p = .75$, $\eta_p^2 < 0.001$.

11.2.1.3. Perceived status.
As expected, participants' ratings of the perceived status of the occupations were predicted independently by both the manipulations of gender-distribution and salary. Not surprisingly, careers that pay more ($M = 4.98$, $SD = 1.31$) were perceived as higher in status than careers that pay less ($M = 3.89$, $SD = 1.32$), $F(1, 394) = 70.41$, $p < .001$, $\eta_p^2 = 0.15$. In addition, consistent with status value theory, careers where men are in the majority ($M = 4.55$, $SD = 1.41$) were perceived as having higher status than careers where women are in the majority ($M = 4.32$, $SD = 1.42$), $F(1, 394) = 3.83$, $p = .05$, $\eta_p^2 = 0.01$. There was no significant interaction between the two factors, $F(1, 394) = 0.91$, $p = .34$, $\eta_p^2 = 0.002$.

11.2.2. Testing the asymmetry in support for social action

As in the previous studies, we next examined asymmetry in support for social action towards change using a 2 (*Gender Distribution*; male- vs. female-dominated) × 2 (*Salary*; low vs. high) ANOVA. Although we pre-registered a prediction of two main effects, we observed a significant main effect of gender-distribution, $F(1, 394) = 48.94$, $p < .001$, $\eta_p^2 = 0.11$, qualified by a significant interaction between gender-distribution and salary manipulation, $F(1, 394) = 4.81$, $p = .03$, $\eta_p^2 = 0.01$ (see Fig. 5). The effect of salary was not significant, $F(1,$
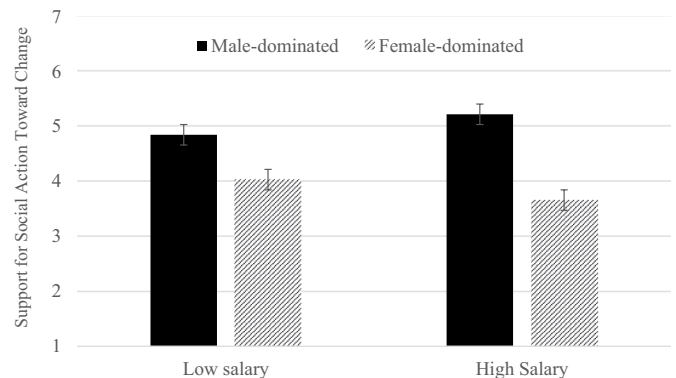

Fig. 5. Study 4 support for social action towards change predicted by interaction between occupation salary and gender-distribution.
Note. Error-bars represent standard errors.

394) < 0.001, p > .99, $\eta_p{}^2$ < 0.001. Pairwise comparisons (LSD) revealed that, in line with our core hypothesis, the predicted simple main effect of gender-representation was significant regardless of salary. However, the effect was somewhat weaker at low ($p = .001$, $\eta^2 = 0.03$) compared to high ($p < .001$, $\eta_p{}^2 = 0.10$) salary levels. Importantly, the strong main effect of gender representation suggests that the effects observed in our prior studies do not merely reflect a tendency to conflate gender distribution with earning potential.

11.2.3. Perceived attributions for underrepresentation

In line with our pre-registered analysis plan, we conducted a series of 2 (*Gender Distribution*; male- vs. female-dominated) × 2 (*Salary*; low vs. high) ANOVAs to identify perceived discrepancies in each of the three theorized *attributions for gender imbalance*. As pre-registered, there was a significant main effect of gender distribution on attributions to a lack of motivation. Participants reported stronger attributions to a lack of motivation for men's under-representation in female-dominated fields ($M = 4.99$, $SD = 1.42$) than they did for women's under-re-presentation in male-dominated fields ($M = 4.05$, $SD = 1.89$), $F(1, 394) = 30.92$, $p < .001$, $\eta_p{}^2 = 0.07$. The preregistered main effect of salary was not significant, $F(1, 394) = 0.01$, $p = .92$, $\eta_p{}^2 < 0.001$, and there was no interaction between the two factors, $F(1, 394) = 0.14$, $p = .71$, $\eta_p{}^2 < 0.001$. This result clearly suggests that people believe men are not interested in joining HEED occupations simply because women are in the majority, rather than because they assume these careers will pay a lower salary.

No specific hypotheses were pre-registered for the other two attri-bution measures, but exploratory analyses revealed a similar pattern for attributions to *lack of ability*. There was a significant main effect of gender-distribution, $F(1, 394) = 17.56$, $p < .001$, $\eta_p{}^2 = 0.43$, wherein participants more strongly attributed men's under-representation in a female-dominated field ($M = 2.79$, $SD = 1.62$) as compared to women's under-representation in male-dominated field ($M = 2.14$, $SD = 1.42$) to a *lack of ability*. There was no main effect of salary, $F(1, 394) = 1.52$, $p = .22$, $\eta_p{}^2 = 0.004$, or interaction between the two factors, $F(1, 394) = 0.32$, $p = .57$, $\eta_p{}^2 = 0.001$. Similar to the results for attributions to a lack of motivation, people believe that men lack the ability to enter HEED domains because more women are employed in such fields, re-gardless of how much these occupations pay their employees.

Finally, the 2 × 2 ANOVA predicting attributions to *prohibitive norms* revealed a significant interaction between gender-distribution and salary, $F(1, 394) = 17.10$, $p < .001$, $\eta_p{}^2 = 0.04$ (see Fig. 6), that qualified a significant main effect of gender-distribution, $F(1, 394) = 19.03$, $p < .001$, $\eta_p{}^2 = 0.05$, in the absence of a salary main effect, $F(1, 394) = 0.35$, $p = .56$, $\eta_p{}^2 = 0.001$. Pairwise comparisons (LSD) revealed that at low salary levels, participants perceived no sig-nificant difference in *prohibitive norms* between male- and female-

Fig. 6. Study 4 *attributions to prohibitive social norms* predicted by interaction between occupation salary and gender-distribution.
Note. Error-bars represent standard errors.

dominated occupations ($p = .87$, $\eta_p{}^2 < 0.001$), but when salary levels were high participants made significantly stronger *attributions to pro-hibitive norms* blocking women from entering male-dominated fields (vs. men from female-dominated fields; ($p < .001$, $\eta_p{}^2 = 0.08$). Within gender-distribution conditions, there were significant effects of salary for both male-dominated ($p = .01$, $\eta_p{}^2 = 0.02$) and female-dominated ($p = .001$, $\eta_p{}^2 = 0.03$) occupations. Thus, in the case of external bar-riers to gender equality in careers, people seem to attribute a lack of women in higher-paying fields like STEM and leadership to prohibitive social norms, while also thinking that prohibitive norms are not a problem for men in higher-paying HEED-related fields. But, in fields where salary levels are low, people believe that prohibitive norms play an equally moderate role in barring men and women from entering jobs where they are in the gender minority.

11.2.4. What attributions predict social action support?

The above pattern of results suggests two core effects to explain: One is the predicted main effect of gender representation on support for social change, the other is the unexpected interaction between gender representation and salary. To first understand the predicted main effect of gender representation, we conducted a pre-registered mediation model testing the indirect effect of gender representation on support for action via attribution. Using PROCESS for SPSS we entered gender-distribution condition (0 = male-dominated, 1 = female-dominated) as main predictor variable, support for social action (standardized) as outcome variable, and the three attributions (standardized) as si-multaneous mediators, with salary condition included as a covariate in the model. Replicating the findings in Studies 2 and 3, results yielded a significant indirect effect via motivation, $a*b = -0.09$, $SE = 0.03$, $CI_{.95}$ (-0.16, -0.04) (model 4; see Fig. 7). There was also a significant in-direct effect via prohibitive norms, $a*b = -0.15$, $SE = 04$, $CI_{.95}$ (-0.25, -0.08), but no significant indirect effect via ability, $a*b = -0.01$, $SE = 0.02$, $CI_{.95}$ (-0.05, 0.03).

In an attempt to parallel the models tested in Studies 2 and 3, we also tested an exploratory serial mediation model of gender re-presentation on support for change, first via perceived status, then at-tributions. Using PROCESS for SPSS (model 6) we entered gender-dis-tribution condition (0 = male-dominated, 1 = female-dominated) as main predictor, support for social action (standardized) as outcome, perceived status (standardized) as the first mediator, and attribution to a lack of motivation (standardized) as the second mediator, as well as salary condition, lack of ability, and prohibitive norms as covariates (see Fig. 8). Replicating results in both Studies 2 and 3, we observed a significant serial mediation via attributions to a lack of motivation, $a*b = -0.01$, $SE = 0.004$, $CI_{.95}$ (-0.02, -0.001). Note that neither serial mediation via a lack of ability or prohibitive norms was sig-nificant. These results are, again, consistent with the theory that men are assumed to be less interested in pursuing female-dominated careers because those careers are assumed to have lower status, independent of the career's salary.

11.2.5. Exploratory moderated mediation analyses

Recall that, in addition to the predicted main effect of gender re-presentation, the interaction with salary revealed a greater asymmetry in support for social action for higher paying careers. We also observed that among higher paying careers, prohibitive norms were seen as playing a larger role in women's than in men's underrepresentation. We thus tested an exploratory moderated mediation analysis to test whe-ther these attributions to prohibitive norms specifically explain this interactive pattern observed on support for social action. This analysis, using PROCESS for SPSS (model 8), revealed significant moderated mediation, *index of moderated mediation* = -0.29, $SE = 0.08$, $CI_{.95}$ (-0.47, -0.14). The interaction between gender-distribution and salary predicting attributions to prohibitive norms was significant, $\beta = -0.80$, $SE = 0.19$, $CI_{.95}$ (-1.18, -0.42), and the inclusion of this effect in the model reduced the interaction between gender distribution
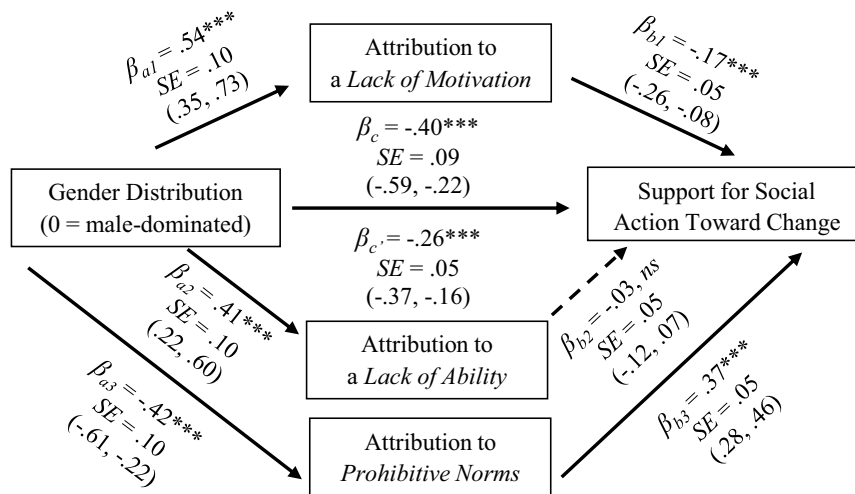
Fig. 7. Gender distribution condition predicting support for social action through attributions (as simultaneous mediators), controlling for salary condition in Study 4.
Note. ***$p < .001$, CI.$_{95}$ in parentheses.

and salary conditions predicting support for change to non-significant, $\beta = -0.11$, $SE = 0.18$, CI.$_{95}$ (-0.46, 0.23). The conditional indirect effect of gender distribution on support for social action via attributions to prohibitive norms was significant only in the high salary condition, $a*b = -0.29$, $SE = 0.07$, CI.$_{95}$ (-0.44, -0.18), and not the low salary condition, $a*b = -0.01$, $SE = 0.05$, CI.$_{95}$ (-0.11, 0.08). The results of this exploratory moderated mediation analysis suggest that, especially in higher paying careers, people expect that women (more than men) face prohibitive norms and this in partly explains their greater support for gender balance in male-dominated than in female-dominated careers. This pattern of mediation via attributions to prohibitive norms is consistent with the findings of only one outcome variable (support for social action), but not in the other outcome variable (funding allocation) in Study 3 or Study 2. Given the apparent unreliability of this result, and the exploratory nature of the tests themselves, we are hesitant to draw strong conclusions about the role that attributions to prohibitive norms play in predicting people's attitudes towards the need for gender equality in male- versus female-dominated occupations.

12. General discussion

Taken together, the current findings show that people appear to think very differently about gender imbalances in a given career depending upon whether the imbalance concerns an underrepresentation of women or an underrepresentation of men. Across four studies, we documented an asymmetry in people's concern about gender imbalances in male- vs. female- dominated careers. In all four studies, people indicated greater support for social action to rectify the gender imbalance in male-dominated as compared to female-dominated fields. This asymmetry in support for change was found both in people's explicit reports for social action (Studies 1–4) and on a budget allocation measure designed to capture support intentions (Study 3). According to this measure, participants were, on average, willing to give $9 million more in funding to promote gender balance in male-dominated than in female-dominated fields. Furthermore, Study 4 revealed that these perceptual differences are mainly driven by the gender-distribution in occupations, and are not merely explained by differences in earning potential.

Consistent with our theorizing and a status value perspective (e.g., Croft et al., 2015; Ridgeway, 1991; Ridgeway & Correll, 2004), these studies reveal that occupations where men are underrepresented (e.g., HEED), are viewed as lower in status, and subsequently less deserving of attention and social action towards change than occupations where women are underrepresented (e.g., STEM). In particular, Study 4
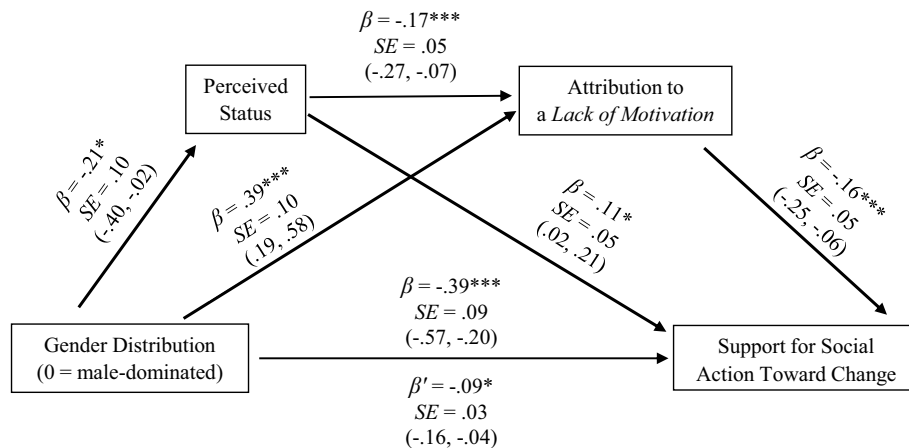

Fig. 8. Serial mediation model of gender distribution condition predicting support for social action through status and attributions to a lack of motivation, controlling for salary condition, attributions to a lack of ability, and attributions to prohibitive norms in Study 4.
Note. *$p < .05$, ***p $< .001$, CI.$_{95}$ in parentheses.

enabled us to isolate the distinct effects of gender distribution and salary in judgments of careers that otherwise have the same job description. As a result, this study best reveals people's biased assumptions that female-dominated careers have less status (regardless of their salary) and therefore are reluctant to support any efforts towards gender balance.

As predicted, people also had different lay theories about the underlying reasons for gender disparities in each domain, which in turn predicted their support (or lack thereof) for efforts to promote greater gender balance. Across Studies 2–4, the most consistent effect was that people perceived a lack of motivation to be a larger barrier to men's entry into female-dominated fields compared to that of women's entry into male-dominated fields. In contrast, prohibitive norms were sometimes seen as a larger factor in women's underrepresentation in male-dominated careers compared to that of men in female-dominated fields (partial support in Study 3 and Study 4), and this was particularly true at high salary levels (Study 4). Considering attributions within-career, men's perceived lack of motivation (Studies 2, 3, and 4) and prohibitive norms (only in Studies 3 and 4 which used more reliable measures) were seen as larger factors in men's underrepresentation than was their perceived lack of ability.

Importantly, discrepancies in support for action and funding allocations (Study 3) were predicted by this tendency to attribute gender imbalances in male- and female-dominated fields to different factors. As we hypothesized (and pre-registered in Studies 3 and 4), the tendency to see a lack of motivation as more important in female- than in male-dominated fields consistently predicted participants' tendency to support more action for changing male- than female-dominated fields. Although patterns were somewhat less consistent across studies, there was also some evidence that the tendency to see prohibitive norms as more important in male- than in female-dominated fields also uniquely explained some of the asymmetry in support for social action, especially in higher salary careers.

Through our controlled study designs (Studies 1–4) and by measuring several confounding variables, we ruled out the possibility that these relationships were simply explained by participants' generally stronger awareness of gender imbalances in male- rather than female-dominated fields, cultural beliefs (e.g., traditional gender role attitudes or political conservatism), demographic variables (Studies 1–3), or differential salary opportunities (Study 4). Especially the between-subjects experimental design of Study 4 provides additional compelling evidence that gender imbalances favoring men versus women are perceived asymmetrically based on gender representation rather than rational considerations of earning potential.

Our evidence suggests that people, on average, are biased in their perception of different gender imbalances. There are some limitations to the generalizability of these findings. We do want to note that with Mturk samples, our participants are likely more representative than traditional undergraduate samples (Paolacci & Chandler, 2014). However, this means that our samples and results is still not representative of all Americans. In addition, we were unable to tests with enough power whether some populations, such as LGBTQ+ individuals, might view gender imbalances in different, less (or more) biased, ways.

One additional limitation of the current data is that it cannot determine the degree to which these relationships are bi-directional. We have proposed a causal model whereby people's attributions for a gender imbalance in certain careers predict their attitudes towards the need for social change and their willingness to allocate funds to causes designed to ameliorate gender imbalances. It is also possible that people are simply less interested in supporting efforts to increase the number of men in these particular careers (for reasons that were not measured here), and participants merely rationalized this intuition after the fact by emphasizing a lack of motivation among men to enter female-dominated careers (consistent views of moral reasoning; Haidt, 2001). Indeed, other work has also shown that people will change their lay theories if doing so serves the conclusions they want to reach (Leith

et al., 2014).[10] Future research is needed to directly manipulate the attributions people have about these patterns of underrepresentation to document the causal effects of attributions as the key mechanism.

Our studies provide important evidence on the role of status in the perception of gender imbalances. The results of Studies 2 and 3, on their own, might have suggested that the perceived status differences of male- and female-dominated careers plays some role in predicting the asymmetry of social action. In those studies, status discrepancies significantly predicted the extent to which participants supported more action and funding for male- than female-dominated careers. Exploratory mediation analyses suggested that attributions to a lack of motivation (at least partially) accounted for the relationship between discrepancies in career-status and discrepancies in support for action (and funding allocation). These results are consistent with a broader conceptual model proposed by Croft et al. (2015) whereby the lower status of communal roles means that men are less likely to be socialized to internalize communal traits and values, which then predicts men's lower interest in communal roles. Both gender-distribution and status of a career, however, could be confounded with perceived salary opportunities.

The addition of Study 4 enabled us to garner some insight into the causal processes resulting from gender-distribution and salary level. Although these two factors are often confounded naturalistically (England et al., 2001; Ridgeway, 2014), we were able to disentangle them by orthogonally manipulating each construct, and measuring their independent effects on perceived status. As expected, each one plays a unique role in elevating the *status* of a given career (i.e., more men than women and higher salary level). Notably, serial mediation analyses further suggested that when men (vs. women) are underrepresented in a career (regardless of salary), the career is presumed to have lower status and men are assumed to be less motivated to pursue that career. Thus, men's presumed lack of interest in female-dominated careers is perhaps explained more by the mere presence of women than by the salary potential of these jobs.

The biases revealed by Study 4 help to address a common argument against efforts to encourage men to take on traditional female-dominated roles. An often-used retort is that men would be sacrificing earning potential by entering careers that do, on average, pay less. Here we see, that even if these careers do not pay less, people assume that men will be less interested in any career that is majority female. Because these assumptions, regardless of the reality of men's career decisions, might prevent people from supporting social action, they can place important constraints on social change. The biases discussed here thus have the potential to create a self-fulfilling prophecy in that people are also less interested in promoting pay raises in female-dominated caregiving careers (Block et al., 2018), and yet if more men were to enter these occupations, the salaries in these fields might also rise (Levanon, England, & Allison, 2009).

The current set of findings also has important implications for *broader* conceptions of gender equality, and subsequent shifts towards occupational gender equality. People's lay theories for why they and others choose to adopt specific social roles are likely to have downstream consequences for which domains garner attention and resources on an institutional level, especially when it comes to systematic approaches to promote diversity and inclusion. The tendency to assume that men avoid female-dominated careers more due to internal than to external factors can lead us to neglect the role that social stereotypes, gender norms, and prejudice can have in shaping values and self-concepts (Croft et al., 2015). Therefore, it is important to bear in mind that even if some choices *appear* to be constrained by internal factors more

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[10] For example, when testing the reverse mediation models wherein gender distribution predicts attributions for the imbalance indirectly via support for social action towards change, significant indirect effects for both motivation and norms (but not ability) are also consistent with this causal theory (Study 4).

than external ones, the underlying psychological processes are likely to be more entangled than they seem on the surface.

Recent research and theorizing support the case for seeking gender equality in all domains, rather than only those in which women are under-represented (see Croft et al., 2015 for a review). For example, major workforce shortages in fields like nursing and social work could be improved by the active recruitment of men, rather than relying on traditional recruitment efforts targeted at women, and seeing a greater proportion of male role models in such fields might enhance men's own internalization of communal values and subsequent interest in female-dominated careers (Block et al., 2018). There is also evidence that both women (Croft et al., 2019) and girls (Croft et al., 2014) might benefit from seeing more men in non-traditional roles and occupations, which might provide them with a greater capacity to pursue non-traditional opportunities in their own lives. But in order to work towards broader social change in these ways, the first step is to make the public and decision makers (e.g., governments, funders, policy makers, etc.) aware of the discrepancy, and then work towards rectifying it.

In sum, these studies provide empirical support for the novel hypothesis that people tend to show stronger support for change in careers that are male-dominated, such as STEM and leadership, compared to careers that are female-dominated, such as HEED. This discrepancy in support is further be explained by a difference in lay theories underlying people's perceived reasons for the under-representation of a given gender. Men are believed to be less motivated to pursue HEED roles, whereas women are believed to be barred from STEM roles by discrimination and other external barriers. The differential status between male-and female-dominated occupations might be a key reason why men are assumed to be less interested in pursuing female-dominated careers. Future work can build on these results by exploring ways to manipulate people's perspective that internal and external factors underlie only certain gender imbalances, in an effort to increase overall support for occupational equality across career types.

Open practices

Data for all studies are shared openly under: https://osf.io/8j7ub/. Studies 1 and 2 were not pre-registered.

The frozen pre-registration for Study 3 can be found under: https://osf.io/xu87y/.

The frozen pre-registration for Study 4 can be found under: https://osf.io/zwg57/.

Appendix A. Full funding allocation measure

Instructions

Imagine the state government of Michigan is currently having budget discussion for 2019. They currently have set a budget of $100 million to dedicate to initiatives at in *high schools*. However, this budget now has to be distributed among several causes within high schools. To make their decisions, lawmakers are interested in what programs are actually most important in the eyes of the general public. We are thus asking you to think about the importance of different initiatives in high schools. For this, we want you to think about how YOU would distribute the budget among the following initiatives.

To make this easier, please think about the percentage of the budget that goes to each initiative. The minimum percentage you can give to an initiative is 1%, otherwise you can distribute the budget as you see fit, as long as it adds up to 100%.

Please read the description of each initiative CLOSELY and make your decisions after that.

1. STEM (science & Tech):
   EgGS – Engaging girls in STEM

Women are underrepresented in careers in Science, Technology,

Engineering, and Math (STEM). EgGS is an initiative to provide resources and experiences for high school girls to be better prepared for careers in STEM fields. The initiative works together with schools to create opportunities for female high school students to engage with STEM subjects more deeply and to learn from women who are already successfully navigating careers as STEM professionals. Programs inside and outside of the classroom are tailored to offer high school girls insights, knowledge, and strategies to more confidently pursue their academic and professional career in STEM.

2. STEM (computer):
   #GirlsWhoCode

Girls and women have been traditionally less engaged in computer programming and learning coding languages than have men and boys. Girls Who Code is a broad initiative with the goal of engaging girls in computer programming and teaching them coding skills in a fun and engaging environment. The initiative focuses on conducting summer camps for girls in which participants learn coding and get to meet key figures from the tech industry. In addition, the initiative helps start computer science clubs in high schools that provide opportunities to learn and strengthen programming skills to set girls on a trajectory of pursuing a career in a computer-related field.

3. HEED (teaching):
   Future male teacher academy

Men are underrepresented as educators, especially at the pre-school, and elementary-school level. Future Male Teacher Academy is a large initiative that aims to set young males in high schools on the path of becoming a teacher in their future. Focusing on summer camps, the initiative creates programs in which high school boys are afforded resources and experiences that set them up to pursue a career an educator. Learning from other male teachers in these summer camps, participants can practice and hone their teaching skills in a fun and engaging environment.

4. HEED (healthcare):
   He cares – engaging boys in HEalthcare

Nursing is one of the largest occupations in the U.S., yet male nurses are very uncommon. He Cares is an initiative to foster high school boys' engagement and interest with healthcare careers, and especially nursing. The initiative teams up with schools to provide educational content and after school programs. After school programs are set up to bring in male nurses as workshop-facilitators who share their experiences in healthcare fields, and help participants develop the skill-set they will need to later take on a healthcare careers like nursing.

5. Control 1 (health - fitness):
   Fit to learn

Today, children engage in less physical activity than even a decade ago. Healthy students are better prepared to learn. Fit to Learn is an initiative that makes healthy habits part of how kids learn. It engages teachers and principals in prioritizing health and fitness in the classroom and throughout the school. The initiative focuses on boosting physical activity. The program sets up each school to implement better fitness practices by provides practical methods for making health and fitness a regular part of the school experience while meeting academic standards.

6. Control 2 (health - nutrition education):
   UNI - urban nutrition initiative:

A lack of knowledge about healthy nutrition and how to obtain it

has been identified as an obstacle to health among American teenagers. The Urban Nutrition Initiative has a talented team of nutrition educators who partner with teachers and school staff to deliver food education programs and activities. Programs put on by UNI stress the importance of where food comes from, growing food, good nutrition, food culture, and provides an opportunity for students, staff, and community members to take a leadership role in promoting healthy lifestyles within school environments.

7. Control 3 (health - food providing)
   School breakfast initiative

A nutritious breakfast prepares children for their day and ensures that they can properly focus on class. Yet, many children do not get breakfast at home, often for economic reasons. The School Breakfast Initiative provides cash assistance to schools and helps set up infrastructure to start free breakfast programs in schools. In these programs, students, and especially students identified as in need, are provided a nutritious breakfast every morning to ensure they are ready to start their day.

8. Control 4 (academic - career development):
   Linked learning initiative

Many students do not have the skills and knowledge to translate their high school degree into the pursuit of a career. The linked learning initiative is an innovative approach to transforming high school education through a combination of rigorous academics and work-based learning opportunities. The initiative's goal is to effectively provide high school students— especially those who are in low-income and underserved communities— with a solid foundation for success in college, careers, and life. To do so, the initiative helps create classroom content and set up professional development programs as well as internships for high school students.

9. Control 5 (academic - attendance):
   Attendance works initiative

Regular attendance is closely linked to better performance in high school. Yet many students miss class, often for days or even weeks at a time. The Attendance Works initiative teams up with school districts and teachers to find evidence-based solutions for chronic absenteeism in high schools. Together with school districts, the initiative works to address common barriers to getting to school, such as lack of access to health care, a safe path to school, or bullying. For teachers, the initiative develops and holds workshops about strategies for student engagement, with the goal to give teachers the tools to increase attendance.

Appendix B. Supplementary Procedural Details and Analyses

Supplementary information and analyses to this article can be found online at https://doi.org/10.1016/j.jesp.2019.03.013.

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