Lean In Messages Increase Attributions of Women's Responsibility for Gender Inequality

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Abstract

Although women's underrepresentation in senior-level positions in the workplace has multiple causes, women's self-improvement or "empowerment" at work has recently attracted cultural attention as a solution. For example, the bestselling book *Lean In* states that women can tackle gender inequality themselves by overcoming the "internal barriers" (e.g., lack of confidence and ambition) that prevent success. We sought to explore the consequences of this type of women's empowerment ideology. Study 1 found that perceptions of women's ability to solve inequality were associated with attributions of women's responsibility to do so. Studies 2, 3, 5a, and 5b experimentally manipulated exposure to women's empowerment messages, finding that while such messages increase perceptions that women are empowered to solve workplace gender inequality, they also lead to attributions that women are more responsible both for creating and solving the problem. Study 4 found a similar pattern in the context of a specific workplace problem, and found that such messages also lead to a preference for interventions focused on changing women rather than changing the system. Studies 5a and 5b sought to replicate prior studies and document the weakened effects of messages that explicitly explain that women's "internal barriers" are the products of "external barriers" obstructing women's progress. This research suggests that self-improvement messages intended to empower women to take charge of gender inequality may also yield potentially harmful societal beliefs.

Keywords: Inequality; diversity; self-help ideology; victim blame; attributions

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Despite progress in recent decades, women continue to be underrepresented in senior-level positions in the workplace. Recent statistics indicate that women hold less than 5% of CEO positions and 19.9% of board seats at S&P 500 companies (Catalyst, 2015a, 2015b). The picture is similar in academia: Women occupy only about 25% of senior STEM (science, technology, engineering, mathematics) faculty positions in the United States (National Science Foundation, 2015). These estimates are striking because today women make up almost half of the United States labor force (Bureau of Labor Statistics, 2015), and are well represented (56 % of total undergraduate enrollment in 2014) at the undergraduate level in American universities (National Center for Education Statistics, 2015).

Women's under-representation at the highest levels of the workforce is multiply determined (e.g., Gino, Wilmuth, & Brooks, 2015; Heilman & Eagly, 2008), but remedies hinging on women's own self-improvement or "empowerment" (Fraser, 2013; Keller, 2011) have attracted substantial attention in popular culture, as reflected in numerous bestselling books, women's magazines, and online media. These empowerment messages suggest that women can tackle gender inequality themselves by overcoming the "internal" barriers that prevent success—that is, variables internal to women that might hurt their advancement, such as their preferences and behaviors. For example, the bestselling 2013 book by Facebook executive Sheryl Sandberg, *Lean In*, aims to "change the conversation from what women can't do to what they can" (Sandberg, 2013), advising that women take charge of their own careers by "sitting at the table," taking risks, being more confident, and pushing themselves harder to reach high-level positions.

Although these cultural messages target individual women's empowerment, they also describe these strategies as a means to help all women. In Sandberg's words, "conditions for all

women will improve when there are more women in leadership roles giving strong and powerful voice to their needs and concerns" (Sandberg, 2013, p. 7). Books and other media expressing this approach do not ignore external factors that may create or sustain inequality, such as discrimination and structural obstacles against women's career advancement (Cheryan, Ziegler, Montoya, & Jiang, 2017; Rodino-Colcino, 2018; Valian, 1998), which center on collective action to address structural injustice (Ahmed, 2010; Eisenstein, 2009; Fraser, 2013). However, the empowerment or self-improvement approach to gender inequality predominantly focuses on the achievement of individuals rather than the group at large (McRobbie, 2009; Rosalind, 2007). Such individualized feminism,[1] Keller (2011) writes, "…privileges individual action and the individual's ability to change their own situation, rather than collective movement or change." As explained by Deborah Siegel in her 2007 book *Sisterhood, Interrupted* (Siegel, 2007, p. 123): "Feminism should no longer be about communal solutions to communal problems, but individual solutions to individual problems." Of course, millions of women's individual achievements may indeed lead to social transformation. However, by encouraging women to move up the professional ladder one woman at a time (Rottenberg, 2014), this solution puts a strong emphasis on the role of individual women to address gender inequality. Feminism, defined as "a movement to end sexism, sexist exploitation, and oppression" (hooks, 2000) is recast in personal, individualized achievements. This highly individualized version of feminism may be more appealing in cultures, like those of many Western nations, which have a dominant emphasis on the individual.

Women's empowerment messages are also positively and optimistically framed, focusing on women's future actions rather than on their past actions. Based on research showing that

[1] For similar concepts, refer to Rottenberg's (2014) "neoliberal feminism" and Fraser's "meritocratic corporate feminism" (Brenner & Fraser, 2017).

minority group stereotypes are more palatable when framed in positive terms, we suspect that more negative messages explicitly criticizing women's past actions as the cause of inequality would be less popular and persuasive (Czopp, Kay, & Cheryan, 2015; Eagly & Mladinic, 1989; Glick & Fiske, 1996). Women's empowerment messages, like many other forms of self-help advice, imply criticism but directly express only positively framed advice. "Women can improve themselves and change the world for the better" is a more positive message than "Women are to blame for their own sorry situation." By prioritizing individual agency and by framing the messages as advice for the future, rather than criticism for the past, we suspect that women's empowerment messages may have the potential to shape the understanding of gender inequality and the search for solutions.

We base our specific predictions on pioneering theoretical work in attributions (Brickman et al., 1982). This work theorized that attributions for responsibility for social or personal problems take two forms: (1) responsibility for the problem, and (2) responsibility for the solution. Responsibility for the problem, in this model, describes responsibility for the origin of the problem, or causal responsibility. Responsibility for the solution, in contrast, describes responsibility for finding a solution, or control over outcomes. Brickman et al. (1982) theorize that the two forms of responsibility are conceptually distinct, but will often be correlated. We predict that as a result of an increase in perceptions of women's ability to address workplace inequality, empowerment messages will affect both types of responsibility, as explained below.

Women's power to address gender inequality in the workplace. First, we predict that these messages will increase perceptions of women's ability to improve gender equality in the workplace. Women's empowerment messages directly state that women can solve the problem by overcoming their internal barriers. Thus, these messages should (if effective) lead to

perceptions that women have more power and self-efficacy (Bandura, 1977, 1982) to tackle the problem. Although the efficacy of some of these strategies is not certain (e.g., Rudman, 1998), we expect that exposure to these ideas will nonetheless be persuasive for the reasons stated above, and thus, lead observers to perceive women as more capable of handling the problem. In our studies, we measure perceptions of empowerment following the manipulations, to ensure that these messages are indeed successfully conveying that women have the power to solve the problem.

Women's responsibility for the solution. Next, we suggest that by focusing on how women can improve the situation through changing themselves, these messages will also increase beliefs that women should play a larger role in addressing gender inequality (Baker, 2008)—that is, attributions of women's responsibility for doing so. Although these messages do not explicitly indicate that women are responsible for addressing the problem, we suspect that they imply women's responsibility by primarily focusing on what women can do. That is, we predict that when people read that "women can solve the problem by leaning in," they will be likely to perceive that "women should solve the problem by leaning in."

The tendency to move from perceptions of empowerment to responsibility for addressing the problem is logical: If women have the power to make a change, there is more reason to assign responsibility to them to make that change. If the messages communicated that women were unable to change the situation, presumably observers would find women less responsible for doing so (e.g., Crandall et al., 2001). That being said, this tendency may also depend on broader cultural forces, such as the emphasis on individual agency. It is common for members of Western cultures to overestimate the importance of individual factors in driving social outcomes (Gilbert & Malone, 1995; Morris & Peng, 1994; Ross, 1977). People in Western cultures tend to

note and attend to the actor's role in altering her environment rather than the environment's role in affecting the actor (Jones, 1979; Menon, Morris, Chiu, & Hong, 1999). The strength of individualism within Western cultures means that if Person X is suffering from a certain problem, and has the potential to fix it, the default assumption is that Person X should put in the effort to end his/her suffering, even if Person Y is the one who caused the problem. Thus, when people consider who should be responsible for solving a particular problem, it seems likely that perceivers in Western cultures would gravitate towards preferring attributions of responsibility that put the onus on individuals changing their own circumstances.

Such a tendency would also be consistent with other ideological and motivated beliefs. For example, dominant Western ideologies emphasize the value of individuals bringing about their success through their own hard work rather than relying on others to make it happen for them (Katz & Hass, 1988). Similarly, the motivation to see gender inequality as fair (Callan & Ellard, 2010; Hafer & Bègue, 2005; Lerner, 1980), the desire to maintain the status ago (Jost & Banaji, 1994), and the motivation to preserve women's lower status in the social hierarchy (Pratto, Sidanius, & Levin, 2006) may all promote this tendency to infer responsibility from empowerment in this context. For example, justice motivations may encourage observers to embrace the idea that women are responsible for their own situation, as that idea allows for observers to see the world as fair (Lerner, 1980). Finally, this tendency may also emerge from a perception that women's empowerment, an increase in agentic potential, reduces women's vulnerability to harm from others (Gray & Wegner, 2009). Thus, once exposed to arguments suggesting that individual women *can* solve gender inequality via their own actions – an

argument that is consistent with default ideological schemas and social motivations in Western societies – people may more readily conclude women *should* be the ones to do it.[2]

Women's responsibility for the problem. Finally, we suggest that women's empowerment messages will lead to the perception that women have contributed to the problem's existence or continuation. Women's empowerment messages do not state that women created workplace gender inequality. Instead, they suggest that women can solve inequality through self-improvement (e.g., "Far from blaming the victim, I believe that female leaders are key to the solution"; Sandberg, 2013, p. 11). The central message is that women have the ability to do something about a problem that already exists, not that women have done something in the past to cause it.

This future focus differentiates these messages from those that more explicitly state an actor's causal connection to the outcome, such as those blaming cancer patients for smoking or eating poorly (e.g., Lerner, 1980). Nonetheless, despite the lack of explicit connection, we suggest that people impute that knowledge from advice about how women should change their behavior going forward (also see Brickman et al., 1982). Because people are motivated to see others as getting what they deserve, they tend to rationalize instances of inequality as being caused by victims of said inequality (Lerner, 1980). Although women's empowerment is focused on potential future solutions rather than past actions, given people's tendency to look for victim-blaming explanations for unfairness (Callan & Ellard, 2010; Jost & Kay, 2010; Lerner, 1980), we suspect that these messages may lead people to infer women's causal role in creating ongoing gender inequality. Just as people can conclude that "if avoiding cigarettes may prevent cancer,

[2] This logic inverts the philosophical principle claiming that the concept of "ought" necessarily implies the concept of "can" (e.g., Kant, 1787/1988). According to Žižek (1999), by focusing on what one can do, self-improvement messages and the like can appeal to the increased emphasis on managing people through the notions of choice and freedom.

then cancer victims have caused their own disease," here they can conclude that "if women can get ahead by being more assertive, then they're causing inequality by not doing so." (Of course, unlike with cigarette smoking and rates of lung cancer, there is no existing evidence that "leaning in" can actually produce the desired change). Thus, in essence, we hypothesize that perceivers confuse attributions of controllability of downstream consequences (women can help solve the problem) with attributions of controllability of the initial cause (women caused or contributed to the problem).

Consequences for solutions to gender inequality. Women's empowerment messages also have the potential to affect people's support for different types of interventions to address gender inequality in the workplace. We predict that these messages will lead people to prefer solutions that rely on women changing themselves to those that require broader systemic change. As people seek to understand workplace problems, they may be guided by the sense that women should be doing more to solve these issues themselves, rather than asking companies to change their structures or processes, or pushing for broader social change.

The Present Research

We tested our hypotheses in six studies. Study 1 examined the association of (a) beliefs in women's power to address the problem of workplace gender inequality, (b) women's responsibility for solving the problem, and (c) women's responsibility for creating the problem. Using confirmatory factor analysis, Study 1 also tested whether these three variables are distinguishable constructs. Studies 2, 3, 4, 5a, and 5b examined the causal influence of exposure to women's empowerment messages on perceptions of women's responsibility for creating and addressing workplace gender inequality. Experimental manipulations were texts taken directly

from the bestselling book *Lean In* (Studies 2 and 4) and audio clips of Sheryl Sandberg's two TED talks on gender inequality (Study 3).

Study 4 tested these same hypotheses in the context of female engineers in Information Technology, and also examined whether the messages shaped preferences for interventions for a specific workplace problem. That is, the study tested the hypothesis that exposure to women's empowerment messages would lead participants to prefer interventions focused on changing the female employees themselves rather than changing more systemic or structural factors, such as upper management or organizational procedures.

Studies 5a and 5b offered replications of the key comparison conditions in Studies 2 and 3, and also tested whether a specific reframing of the *Lean In* message would minimize the effects. In particular, these two studies tested whether messages that directly tie women's internal barriers (e.g., lack of confidence) to external barriers (e.g., discrimination) will weaken the tendency to see women as responsible for gender inequality in the workplace. These studies explore whether there is a way to frame these messages that effectively manipulates empowerment without also manipulating responsibility. If not, these findings would further the notion that there is tension inherent to attempts to empower disadvantaged groups.

The present studies make two key contributions to the literature. First, they demonstrate the attribution mechanisms and effects of women's empowerment ideology on the popular understanding of gender inequality. Second, past attributions work has largely focused on how an actor's causal connection to an outcome leads to responsibility attributions and blame (e.g., Alicke, 2000; Crandall, 1994; Lerner, 1980; Schlenker et al., 1994; Shaver, 1985; Shultz, Schleifer, & Altman, 1981; Stephens & Levine, 2011; Weiner, 1995; Woolfolk, Doris, & Darley,

2006). By exploring the role of perceived empowerment as an antecedent to attributions of responsibility, the studies also contribute to basic attribution research.

Methodological Notes

In all studies, we did not recruit additional participants once we finished data collection. We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in every study. We have focused on the core analyses in the main text, but reference additional analyses that are provided in full in Supplementary Online Materials.

Study 1

Study 1 explores correlations among the variables of interest: Perceived empowerment of women to tackle gender inequality, and perceived responsibility of women for causing and for solving workplace inequality. We predicted that perceptions of women's empowerment would be positively correlated with perceptions of women's responsibility both for causing and solving inequality. We expected that these relationships would hold even after controlling for demographic and personality variables that seemed likely to relate to attributions of women's responsibility—namely, political orientation, participant gender, and social desirability.

In addition, because this study introduces a new scale, which will be the basis of all future studies, we also sought some psychometric information to support our interpretation. In particular, Study 1 uses confirmatory factor analysis to test whether these variables are statistically distinguishable constructs.

Method

Participants. Because we had no strong precedents for estimates of effect size, we followed the guidelines by Schönbrodt and Perugini (2013) and planned to recruit at least 250 participants for this correlational study. This sample size is recommended to achieve stable

estimates for correlations (Schönbrodt & Perugini, 2013). Data collection was stopped on the day that the minimum sample was obtained. Two hundred and ninety-eight U.S. residents were recruited through Prolific Academic, an online survey platform with demographically diverse participants (see Peer, Brandimarte, Samat, & Acquisti, 2017, for details on analyses confirming the platform's quality). Because political orientation has been found to be related to the tendency to blame victims for inequality (e.g., Jost, Glaser, Kruglanski, & Sulloway, 2003), we sought sufficient representation of both conservatives and liberals, and measured political orientation (see procedure section). Fourteen participants who failed an attention check (a reading comprehension task; Downs, Holbrooks, Sheng, & Cranor, 2010; see Appendix A for full text) were excluded from the data analysis, leaving a total of 284 participants (M_{age} = 33.82, *SD* = 12.05; 45.4% female; 49.6% republicans, 50.4% democrats). Results are identical if the fourteen participants are included in the analyses. See Table 1 for additional demographic information.

Procedure and Materials. After completing the attention check, participants filled out 16 items measuring perceptions of gender inequality in American workplaces (see Appendix B for full text). All the items referenced "the problem of gender inequality in American workplaces." Four of the items measured perceived empowerment of women to tackle workplace gender inequality ("Women have power to address the problem," "Women are best able to tackle the problem," "Women are capable of dealing with the problem," and "Women have potential to solve the problem"; α = .79; *M* = 4.93, *SD* = 1.09). The items reflect the popular understanding of empowerment (e.g., Rappaport, 1984; Rowlands, 1997), which is not only associated with individual power and ability, but also with potential (e.g., Maslow, 1968; Rogers, 1951; Sennett, 2007) and individual capacity (e.g., Nussbaum, 1999; Sen, 1982).

Two of the items measured perceptions of women's responsibility to solve the problem ("Women should do the work to fix the problem" and "Women are responsible for solving the problem"; $r = .58$, $p < .001$; $M = 4.04$, $SD = 1.30$). Two of the items measured women's responsibility for creating the existing problem ("Women have caused the problem" and "Women have contributed to the problem"; $r = .60$, $p < .001$; $M = 3.20$, $SD = 1.53$). Participants also answered the same eight items but referring to men instead of women: perceived empowerment of men ($\alpha = .76$; $M = 5.10$, $SD = 1.03$), perceived responsibility of men to resolve the problem ($r = .74$, $p < .001$; $M = 4.43$, $SD = 1.48$), and perceived responsibility of men for creating the problem ($r = .72$, $p < .001$; $M = 4.89$, $SD = 1.61$).[3] The 16 items were rated on a 7-point scale (*1 – Strongly Disagree, 7 – Strongly Agree*), and their order of presentation was randomized.

Participants then completed a short social desirability measure, composed of eight highly loading items from the original social desirability scale (Crowne & Marlowe, 1960). Four of the negatively worded items (e.g., "I like to gossip at times") were reverse-coded and were combined with the four positively worded items (e.g., "I am always careful about my manner of dress") to form a composite (sum) score for social desirability ($M = 3.79$, $SD = 2.25$). The scale achieved acceptable reliability ($\alpha = .74$). Higher scores on this scale indicated greater need for approval (see Appendix C for the list of items used). We included this social desirability measure because we thought it might predict responses to political statements about the role of men and women in the workplace, and because we sought to test for any role of positivity bias or response bias in our dataset (e.g., people who score higher on this scale may hold women less responsible for gender inequality). Finally, participants reported their gender and their political orientation,

[3] We include the 8 items referring to men in all studies, although our focus is on women. We do not find consistent associations or effects with these measures; all such findings are provided in Supplementary Online Materials.

measured by a 7-point scale (*1 – Very Liberal, 7 – Very Conservative*). We included these measures as we assumed that both might predict the tendency to assign responsibility to women for gender inequality, and to test for any confounding role of such variables in the correlations of interest.

Results and Discussion

Confirmatory Factor Analysis. We conducted a confirmatory factor analysis on the women-focused items, using Stata software (StataCorp, 2011) to examine whether the hypothesized model has a relatively good fit, compared to two alternative models. If so, that supports treating the three constructs as distinct for the purpose of later analyses.

The first structure tested was the hypothesized three-factor model (empowerment; responsibility for solving the problem; responsibility for causing the problem). The second structure tested was a two-factor model (empowerment; combined responsibility for both causing and solving), while the third was a different two-factor model (combined empowerment and responsibility for solving; responsibility for causing).

Results indicated that the first structure performed the best. Model fitting results indicated a poor fit for the third structure, as this structure failed to converge. The first structure (CFI = 0.921, χ^2 = 81.86 (17) = .0000, SRMR = 0.077, RMSEA = 0.116 (90% C.I. 0.091 0.142) had a better fit than the alternative second structure (CFI = 0.755, χ^2 = 220.62 (19) = .0000, SRMR = 0.123, RMSEA = 0.193 (90% C.I. 0.171 0.217). Therefore, we used the three-factor model (i.e., 4-item perceived empowerment of women, 2-item perceived responsibility of women for solving the problem, 2-item perceived responsibility of women for creating the problem) in this and all subsequent studies. The same pattern of results emerged when using the

data from Studies 1, 2, 3, 4, 5a, and 5b (total N = 1,930).[4] Thus, the results of the CFA suggest that the three constructs are statistically distinguishable, which allows for greater confidence in the use of the measures in later studies.

Correlations Among the Variables of Interest. See Table 2 for the correlations among the variables of interest. As predicted, perceptions that women are empowered to tackle workplace gender inequality was positively correlated with attributions of women's responsibility for solving the problem, $r(284) = .52$, $p < .001$. Perceptions that women have responsibility for solving gender inequality were positively correlated with attributions of women's responsibility for causing inequality, $r(284) = .35$, $p < .001$. In contrast to our prediction, perceived empowerment of women was not positively correlated with attributions of women's responsibility for causing inequality, $r(284) = .008$, $p > .250$. These relationships held when gender, political orientation, and social desirability were included as covariates in the analysis.[5] Thus, the tendency to see women as empowered to tackle the problem of gender inequality was related to the tendency to see women as responsible to solve workplace gender inequality, but not for its cause.[6]

Study 2

In Study 2, we sought to manipulate perceptions of women's empowerment to determine if exposure to women's empowerment messages would affect attributions of women's

[4] The hypothesized three-factor model (CFI = 0.925, $\chi^2 = 465.336$ (17) = .0000, SRMR = 0.069, RMSEA = 0.117 (90% C.I. 0.108 0.126) had a better fit than the alternative second structure (CFI = 0.825, $\chi^2 = 1068.413$ (19) = .0000, SRMR = 0.098, RMSEA = 0.169 (90% C.I. 0.161 0.176); the third structure again failed to converge.

[5] In covariate-included analyses, perceived empowerment of women was positively correlated with attributions of women's responsibility for solving the problem, $r(279) = .52$, $p < .001$, but was again not significantly correlated with attributions of women's responsibility for causing the problem, $r(279) = .07$, $p = .238$. The two types of attributions were positively correlated, $r(279) = .36$, $p < .001$.

[6] However, in conducting the same correlations with the rest of our datasets that used this measure, we found a significant and positive correlation between perceived empowerment of women and attributions of women's causal responsibility in every other study (i.e., Studies 2, 3, 4, and 5a) except one (i.e., Study 5b). See tables 2-7 for details.

responsibility for both creating and solving gender inequality in the workplace. Study 2 employed self-improvement messages taken directly from the book *Lean In*. We expected that the messages, which aim to empower women, would succeed in doing so, but would also result in additional attributional consequences.

Method

Participants. No prior work used this or a similar manipulation; thus, we had no strong precedent for estimates of effect size. Without any such guidance, we predetermined a sample size required to detect an intermediate effect ($f = 0.175$) to achieve adequate power ($1 - \beta > 0.80$). This analysis indicated that we needed at least 360 participants for a four-cell design study. Data collection was stopped on the day that the minimum sample was obtained. Four hundred seventy-one United States residents were recruited online via Amazon's Mechanical Turk (see Buhrmester, Kwang, & Gosling, 2011, for details on analyses confirming the quality of the platform). Thirty-one participants who did not pass the attention check (identical to that used in Study 1, and reported in full in Appendix A) were excluded from analyses, leaving a total of 440 participants ($M_{age} = 34.36$, $SD = 11.06$; 52.3% female). The results below are identical when including those thirty-one participants in the analyses. See Table 1 for additional demographic information.

Procedure and Materials. All participants first completed the identical attention check used in Study 1. Next, as a manipulation, we gave participants unaltered passages from Sandberg's book *Lean In* (2013, p. 5-8). These passages (except the instructions paragraph about the female leader who is ostensibly giving the statements) were extracted from the introduction of the book, in which Sandberg discusses both "internal" (psychological) and "external" (structural) barriers against women in American workplaces. In keeping with the rest of the

book, and the way in which the book is represented in popular culture, Sandberg's (2013) focus in the introductory chapter is on women's own self-improvement. She directly states that the book focuses more on women overcoming the internal barriers ("Internal obstacles are rarely discussed and often underplayed…These internal obstacles deserve a lot more attention…", p. 9) than the external obstacles. However, because this section of the book briefly discusses both types of barriers, it offers an opportunity to test the relative effects of women's empowerment messages compared to messages emphasizing structural/system factors. Using Sandberg's own text in all experimental conditions also holds stylistic and cultural language patterns constant.

Participants were randomly assigned to one of four conditions (baseline vs. external barriers vs. internal barriers vs. combined barriers). In the baseline condition, participants (N = 115) read no text, and simply completed the dependent measures. In the external barriers condition, participants (N = 111) read statements (taken directly from the introductory chapter of *Lean In*) attributing workplace gender inequality to external barriers that exist for women (e.g., lack of flexibility at work, discrimination, the structures stacked against women). In the internal barriers condition, participants (N = 108) read statements (taken directly from the same chapter) attributing the problem to "internal barriers that exist within" women (e.g., holding oneself back, internalizing negative messages, lowering one's own expectations). This condition captures the rhetoric common to the women's empowerment approach to gender inequality, in that the statements promote women's achievement via overcoming internal (i.e., psychological) barriers. A fourth condition, the combined barriers condition (N = 106), combined the statements from the other two experimental conditions. We added this condition as a conservative comparison. We speculated that given research suggesting people's readiness to hold victims responsible for their misfortunes (Jost & Banaji, 1994; Lerner, 1980), any inclusion of internal barriers messages

might suffice to increase perceptions of women's responsibility, even if complemented by messages about external obstacles such as bias and systemic factors.

Before reading their condition-specific text, all participants (except those in the baseline condition) read background information about gender inequality in American workplaces, ostensibly given by a highly respected female leader (see Appendix D for the text of this background information and manipulations). After reading the background information and condition-specific text, all participants answered the identical 16-item gender inequality questions used in Study 1. The 4-item women's empowerment measure is used here as a manipulation check ($\alpha = .81$; $M = 5.16$, $SD = 1.12$). The other women-oriented items form the dependent measures: a) 2-item perceived responsibility of women to solve the problem ($r = .65$, $p < .001$; $M = 4.45$, $SD = 1.35$); b) 2-item perceived responsibility of women for contributing to the problem ($r = .62$, $p < .001$; $M = 3.46$, $SD = 1.54$).

This study also included the same items regarding men's role in workplace inequality. These measures are described and all effects reported, for all studies, in Supplementary Online Materials. There were no consistent effects on the male-oriented items in any of the studies; we return to this topic in the General Discussion.

All the items pertaining to workplace gender inequality were rated on a 7-point scale (*1 – Strongly Disagree, 7 – Strongly Agree*), and their order of presentation was randomized. Finally, participants reported their gender and political orientation (*1 – Very Liberal, 7 – Very Conservative*).[7] See Table 3 for the correlations among the variables of interest.

[7] Gender and political orientation were measured in all studies. We explored their role as predictors and moderators of the condition effects, to determine if these effects held more strongly or weakly for men versus women, and those who are politically conservative versus liberal. Effects were inconsistent across studies, but largely suggested women see themselves as more empowered. All analyses and results are reported in full in Supplementary Online Materials; as they are not related to our hypotheses, participant gender and political orientation are not described further in the main text of the manuscript.

Results

Perceived Empowerment of Women. As predicted, a one-way Analysis of Variance (ANOVA) indicated that condition significantly affected perceptions of women's empowerment to tackle workplace gender inequality, $F(3, 436) = 5.43$, $p = .001$, partial $\eta^2 = 0.036$ (see Figure 1). Contrast analyses revealed that participants in the internal barriers condition saw women as more empowered ($M = 5.43$, $SD = 0.99$) than did participants in the baseline condition ($M = 4.95$, $SD = 1.08$), $F(1, 436) = 10.38$, $p = .001$, or the external barriers condition ($M = 4.96$, $SD = 1.20$), $F(1, 436) = 9.52$, $p = .002$. Participants in the combined barriers condition also saw women as more empowered ($M = 5.33$, $SD = 1.13$) than did participants in the baseline condition, $F(1, 436) = 6.42$. $p = .011$, or the external barriers condition, $F(1, 436) = 5.78$. $p = .016$. The baseline condition and external barriers condition did not differ on perceptions of women's empowerment, $F(1 ,436) = 0.01$, $p > .250$. The two conditions that both contained statements about internal barriers – the internal barriers condition and the combined barriers condition – also did not differ on perceived power of women, $F(1, 436) = 0.44$, $p > .250$.

Perceived Responsibility of Women to Address Workplace Gender Inequality. As predicted, a one-way Analysis of Variance (ANOVA) indicated that condition significantly affected attributions of women's responsibility to address workplace gender inequality, $F(3, 436) = 10.81$, $p < .001$, partial $\eta^2 = 0.069$ (see Figure 2). Contrast analyses revealed that participants in the internal barriers condition held women more responsible for solving workplace gender inequality ($M = 4.81$, $SD = 1.21$) than did participants in the baseline condition ($M = 4.03$, $SD = 1.30$), $F(1, 436) = 19.22$, $p < .001$, or the external barriers condition ($M = 4.18$, $SD = 1.40$), $F(1, 436) = 12.26$, $p < .001$. Similarly, participants in the combined barriers condition held women more responsible for solving workplace gender inequality ($M = 4.82$, $SD = 1.32$) than did

participants in the baseline condition, $F(1, 436) = 19.80$, $p < .001$, or the external barriers condition, $F(1, 436) = 12.74$, $p < .001$. Again, the baseline condition and external barriers condition did not differ on perceived responsibility of women, $F(1, 436) = 0.74$, $p > .250$. The internal barriers condition and the combined barriers condition also did not differ on perceived responsibility of women, $F(1, 436) = 0.01$, $p > .250$.

Perceived Responsibility of Women for Causing Workplace Gender Inequality. A one-way Analysis of Variance (ANOVA) indicated that condition also significantly affected attributions of women's responsibility for causing workplace gender inequality, $F(3, 436) = 12.26$, $p < .001$, partial $\eta^2 = 0.078$ (see Figure 3). Contrast analyses revealed that participants in the internal barriers condition attributed a greater causal responsibility to women for inequality ($M = 4.00$, $SD = 1.27$) than did participants in the baseline condition ($M = 3.10$, $SD = 1.49$), $F(1, 436) = 20.62$, $p < .001$, or the external barriers condition ($M = 3.00$, $SD = 1.58$), $F(1, 436) = 25.21$, $p < .001$. Similarly, participants in the combined barriers condition attributed a greater causal responsibility to women ($M = 3.77$, $SD = 1.57$) than did participants in the baseline condition, $F(1, 436) = 11.33$, $p < .001$, or the external barriers condition, $F(1, 436) = 14.85$, $p < .001$. Again, the baseline condition and external barriers condition did not differ on perceived causal responsibility of women, $F(1, 436) = 0.28$, $p > .250$. The internal barriers condition and the combined barriers condition also did not differ on perceived causal responsibility of women, $F(1, 436) = 1.29$, $p > .250$.

Mediation Analyses. In analyses provided in Supplementary Online Materials, we report evidence that empowerment mediated effects on both dependent measures, in this study, and in every study that follows except Studies 4 and 5b, suggesting that the messages' effect on empowerment shapes their effect on responsibility. Given the difficulty of interpreting

mediational analyses (Bullock, Green, & Ha, 2010; Imai, Keele, Tingley, & Yamamoto, 2011), these analyses (and the other mediational analyses reported in this research) should be interpreted with caution.

Discussion

Thus, Study 2 finds that, compared to baseline or messages focused on external barriers to women's advancement in the workplace, women's empowerment messages (whether coupled with the external barriers-messages or not) achieves one of their apparently-intended effects: Increasing perceptions that women have the ability to address workplace gender inequality. However, as hypothesized, women's empowerment messages also led to potentially negative consequences–attributions that women are relatively more responsible both for creating and solving workplace gender inequality.

Study 3

Study 3 sought to test the same hypothesis as Study 2, using a different medium of the popular messages to generalize the effects beyond the direct texts. We created two audio clips, extracted from two longer talks given in the popular TED series by Sheryl Sandberg, which covered external and internal barriers to women's equality. Given the popularity of TED talks (e.g., Galant, 2014), we thought that this medium aptly simulates how women's empowerment messages are commonly consumed (for instance, Sandberg's two talks have been viewed more than nine million times as of July 2017). Study 3 also made three other small methodological changes. First, we ran only two conditions (internal and external barriers), removing both the baseline condition (to reduce the required N) and the combined barriers condition (to keep length of message constant). Second, we added a question about the study's purpose, to see whether participants were explicitly making the connection between the manipulation and the dependent

measures. Third, we used different wording for the attention/manipulation check, specific to the use of the audio clips.

Method

Participants. We predetermined a sample size required to detect an intermediate effect ($f = 0.193$) to achieve adequate power ($1 - \beta > 0.80$) [given the effect size of the manipulation on perceived empowerment of women in Study 2].[8] This analysis indicated that we needed at least 214 participants for a two-cell design study. Data collection was stopped on the day that the minimum sample was obtained. Two hundred thirty-five United States residents were recruited online via Amazon's Mechanical Turk. Forty-one participants were excluded from analyses, either because they failed the attention/manipulation check (explained in the procedure section; 36 participants) or because they correctly guessed the main hypothesis (5 participants; 2.12% of all recruited participants; e.g., one participant guessed that the study was "seeing if listening to the clip affected my thoughts on the subject"). This left a total of 194 participants (M_{age} = 37.27, *SD* = 12.99; 57.7% female).[9] The results below are identical when including these participants in the analyses. See Table 1 for additional demographic information.

Procedure and Materials. As a manipulation, we gave participants short audio clips (YouTube files) extracted from Sandberg's two TED talks on the topics of gender inequality in the workplace ("Why We Have Too Few Women Leaders," "So We Leaned In…Now What?"). In these talks, Sandberg emphasizes women overcoming internal barriers, but also discusses external barriers, allowing us to compare the effects of messages highlighting internal versus

[8] In our initial design, we used empowerment to create effect sizes for our power analyses. Using either responsibility or contribution instead, the required N would be 110 or 96.
[9] Two participants did not identify themselves as male or female.

external factors. Using Sandberg's own speech in all experimental conditions holds stylistic and cultural language patterns constant.

At the beginning of the survey, all participants were informed that the survey contains a section in which they will listen to a speech. We asked participants if they were ready to listen to the speech and only those who said yes participated in the survey. Next, participants were informed that the survey has two sections. In the first section, participants were told that they will "listen to a speech (about 2 min) and evaluate it for its communication style" and "answer some questions about the content of the speech." Participants were randomly assigned to one of two conditions (external barriers vs. internal barriers). In the external barriers condition (N = 101), participants listened to a short audio clip (2 min) with a closed caption, attributing gender inequality to external barriers against women (e.g., women are expected to do most of housework; gender bias continues to affect women's advancement). In the internal barriers condition (N = 93), participants listened to a short audio clip (2 min 9 sec) with a closed caption, attributing the problem to women's own internal barriers (e.g., women underestimate their own abilities; women lack self-confidence).

We decided to use audio rather than video clips as a manipulation to control for variations in the speaker's appearance, position, body language, etc. We also sought to control for participants' preference to use YouTube's embedded closed caption feature by inserting closed captions into all audio clips. The closed captions also helped to ensure the clarity of the manipulation.

The clips in both conditions started by providing background information about gender inequality. The speaker was identified only as "a highly respected woman who is also an expert in her field." After the portion of the speech providing the background information, participants

then listened to Sandberg speaking either about internal or external barriers to gender inequality (see Appendix E for the transcripts/closed captions of this background information and manipulations).

Next, participants were asked to evaluate the speech ("Now, we would like to ask you a few questions about the speech you just heard. Please remember that there is no right or wrong answer") with two filler items: "How comprehensible are the statements given by the speaker?" (*1 – Not at all comprehensible, 7 – Extremely comprehensible*) and "How clear of a communicator is the speaker?" (*1 – Not at all clear, 7 – Extremely clear*).

Next, participants moved to a new section of the study, explained to be about participants' understanding of workplace problems. All participants answered 16 workplace gender inequality questions, nearly identical to those used in Studies 1 and 2.[10] All the items referenced "the problem of gender inequality in American workplaces." All scales showed adequate reliability (empowerment: $\alpha = .83$; $M = 5.20$, $SD = 1.12$; responsibility for solving the problem: $r = .58$, $p < .001$; $M = 4.48$, $SD = 1.27$; responsibility for creating the problem: $r = .56$, $p < .001$; $M = 3.59$, $SD = 1.51$).

Participants then completed an attention check about the speech. The first item asked whether the speaker was male or female. The second item asked the topic of the speech ("What was the speech about?"; Gender inequality, Racial inequality, Poverty, TV shows, Sports). The third item asked which of the following statements came at the end of the speech; the correct answer varied by condition with the third response option presented as a distractor ("It's just that we judge them through a different lens...in a man, he's a boss, and in a woman, she's bossy", "We

[10] This scale was different from that used in Studies 1 and 2 in that we made minor grammatical corrections: We added the word "the" to four items ("Women [Men] have the power to address the problem" and "Women [Men] have the potential to solve the problem").

assume men can do it all, slash - have jobs and children. We assume women can't, and that's ridiculous...", "We assume men and women are equally capable…and that's a problem."). Participants then reported their gender and political orientation (*1 – Very Liberal, 7 – Very Conservative*). Finally, we asked participants whether they recognized the speaker (no one reported recognizing her), and to guess the true purpose of the study. See Table 4 for the correlations among the variables of interest.

Results

Perceived Empowerment of Women. As predicted, a one-way Analysis of Variance (ANOVA) indicated that the manipulation successfully altered perceptions of women's empowerment to tackle workplace gender inequality, $F(1, 192) = 4.33$, $p = .039$, partial $\eta^2 = 0.022$ (see Figure 4). Participants in the internal barriers condition saw women as more empowered ($M = 5.37$, $SD = 1.16$) than did participants in the external barriers condition ($M = 5.04$, $SD = 1.07$).

Perceived Responsibility of Women to Address Workplace Gender Inequality. As predicted, a one-way Analysis of Variance (ANOVA) indicated that condition significantly affected attributions of women's responsibility to address workplace gender inequality, $F(1, 192) = 11.75$, $p = .001$, partial $\eta^2 = 0.058$ (see Figure 5). Participants in the internal barriers condition held women more responsible for solving workplace gender inequality ($M = 4.80$, $SD = 1.29$) than did participants in the external barriers condition ($M = 4.19$, $SD = 1.19$).

Perceived Responsibility of Women for Causing Workplace Gender Inequality. Also as predicted, condition significantly affected attributions of women's responsibility for causing workplace gender inequality, $F(1, 192) = 6.99$, $p = .009$, partial $\eta^2 = 0.035$ (see Figure 6). Participants in the internal barriers condition attributed a greater causal responsibility to women

for inequality (M = 3.88, SD = 1.47) than did participants in the external barriers condition (M = 3.32, SD = 1.49).

Discussion

Study 3 finds that, compared to messages focused on external barriers against women, women's empowerment messages—those focused on women overcoming their own internal barriers—successfully led to perceptions that women are more empowered to tackle gender inequality at American workplaces. However, as hypothesized, women's empowerment messages also lead to perceptions that women have greater responsibility both for creating and solving gender inequality in the workplace.

Study 4

Like Studies 2 and 3, Study 4 employed an experimental design to test the hypothesis that women's empowerment messages can affect attributions of women's responsibility for inequality. Unlike those studies, Study 4 used a specific workplace context: a major tech company in the United States. Study 4 also extended beyond previous studies to examine how such messages affect the perceived merits of various interventions aimed at solving the problem. Because women's empowerment messages privilege individual action over collective structural change (Keller, 2011), we predicted that exposure to the messages would lead to greater endorsement of interventions focusing on changing the female employees themselves (and less endorsement of structural changes, like changes to process or policy). Study 4 also tested whether attributions of responsibility play a mediational role in shaping endorsement of interventions (cf. Bullock et al., 2010; Imai et al., 2011).

Last, Study 4 also explored whether anti-egalitarianism interacts with our predicted effects. We thought that participants who score higher on anti-egalitarianism – i.e., those who

prefer systematic group-based inequality (Ho et al., 2015) – might interpret women's empowerment messages as an implicit ideology reinforcing gender inequality, thus holding female employees responsible for gender inequality to a greater extent. To explore this idea, we included a recent measure of anti-egalitarianism, the Social Dominance Orientation (SDO_7) scale (Ho et al., 2015).

Method

Participants. We predetermined a sample size required to detect an intermediate effect ($f = 0.171$) to achieve adequate power ($1 - \beta > 0.80$) [given the average effect sizes of the manipulation on perceived empowerment of women in Studies 2 and 3].[11] This analysis indicated that we needed at least 333 participants for a three-cell design study. Data collection was stopped on the day that the minimum sample was obtained. Three hundred fifty-two United States residents were recruited online via Amazon's Mechanical Turk. Twenty-two participants who correctly guessed the purpose of the study (9.37% of all recruited participants; e.g., one participant guessed that the purpose of the study was to examine "whether reading the article…affects our opinions on a situation that involves gender inequality") were excluded from analyses, leaving a total of 330 participants (M_{age} = 35.11, *SD* = 11.94; 46.1% female).[12] The results below hold when including those twenty-two participants in the analyses except in one aspect.[13] Because all findings held with or without exclusions based on the attention check in Studies 1 and 2, we did not include the attention check in Study 4. Like Study 3, however, we still asked participants to guess the purpose of the study because we had no a priori speculation

[11] If the power analyses used effect sizes for either responsibility or contribution instead, the required N would be 147 or 168.
[12] One participant misreported his or her gender as "Caucasian."
[13] An indirect effect of the baseline vs. combined barriers → perceived responsibility of women for solving the problem and for causing the problem (parallel mediators) → perceived effectiveness of structural-change becomes nonsignificant.

about how many participants would correctly guess the purpose with these experimental materials. See Table 1 for additional demographic information.

Procedure and Materials. The manipulation was identical to that in Study 2 except in one key aspect – we administered just three of the four conditions: baseline, internal barriers, and combined barriers. The external barriers condition produced the same pattern of results as the baseline in Study 2, and the information presented in the external barriers condition is presented within the combined barriers condition. We again included the combined barriers condition to investigate the limits of the influence of internal messages – as in Study 2, we expected that the presence of the internal messages would outweigh the external messages, and thus, this condition would produce the same pattern as the internal barriers condition.

Participants were randomly assigned to one of three conditions (baseline vs. internal barriers vs. combined barriers). In the baseline condition (N = 110), participants read no text, and simply completed the dependent measures. In the internal barriers condition (N = 113) and the combined barriers condition (N = 107), participants were informed that they will "read a short speech and evaluate it for its communication style" and read their condition-specific texts. As in Study 2, the background information (about workplace gender inequality) and condition-specific texts they read were ostensibly given by a highly respected female leader. After reading their condition-specific text, participants in the internal barriers condition and the combined barriers condition answered two filler items about the speaker's communication style: "How comprehensible are the statements given by Nancy Sullivan?" (*1 – Not at all comprehensible, 7 – Extremely comprehensible*) and "How clear of a communicator is Nancy Sullivan?" (*1 – Not at all clear, 7 – Extremely clear*).

After reading the background information and condition-specific text, all participants were informed that we are interested in their "understanding of various workplace problems" and were asked to provide their "opinion about what is happening in this workplace." All participants then read background information about a workplace problem at Facebook. This information read as follows:

> According to a recent Wall Street Journal article, Facebook recently conducted a study to look at how the company approves code written by male and female engineers. The study found that code written by female engineers gets rejected 35 percent more often than work by their male peers. During the duration of the study, female engineers also waited 3.9 percent longer for submitted code to be approved, and their work received 8.2 percent more questions from their superiors, as compared to male engineers.

The paragraph was adapted from news articles in the Wall Street Journal (Seetharaman, 2017) and the Guardian (Wong, 2017). According to these articles, a former Facebook software engineer studied the company's code review process and found the gendered code rejection as described above. Facebook conducted an internal investigation to verify this finding and concluded that while the code rejection rate is higher for female engineers, this difference disappears when controlling for the gender distribution between job-levels. Regardless of its cause, the example provides an opportunity to test our hypothesis as it applies to a timely real-world event.

Next, all participants answered the 16-item gender bias questions about Facebook, adapted from the gender inequality scale used in Studies 1, 2, and 3. Items were identical to those

used in prior studies except that a) they now specifically referenced "Facebook's problem with coding rejection rates" rather than gender inequality at American workplaces, and b) the wording of the items have been modified accordingly (e.g., "Female engineers at Facebook" or "Male engineers at Facebook" instead of "Women" or "Men"). Four of the items measured perceived empowerment of female Facebook engineers to tackle this problem ($\alpha = .81$; $M = 4.58$, $SD = 1.20$). Two of the items measured attributions of responsibility of female Facebook engineers to solve the problem ($r = .57$, $p < .001$; $M = 3.85$, $SD = 1.44$). Two of the items measured perceived attributions of responsibility of female Facebook engineers for causing the problem ($r = .71$, $p < .001$; $M = 3.10$, $SD = 1.57$).

All participants next answered four questions measuring the perceived effectiveness of different interventions to solve the coding problem at Facebook. These items were rated on a 7-point scale (*1 – It would be not effective at all, 4 – It would help somewhat, 7 – It would be highly effective*), and their order of presentation was randomized. For these questions, participants were first asked to assume that "Facebook wants its female engineers to succeed at the same rate as its male engineers" and then rate the extent to which "the following changes would help Facebook accomplish this goal." Two of the items focused on structural change as a solution ("Moving to a process in which the engineers' code was reviewed "blind," that is, without the reviewers knowing who wrote the code" and "Training upper management how to avoid applying unconscious stereotypes and biases when evaluating employees' work"). These two items were averaged to form a composite score for perceived effectiveness of structural change ($r = .39$, $p < .001$; $M = 5.64$, $SD = 1.27$). The other two items focused on individual change as solution ("Offering female engineers the chance to do unpaid training, on evenings and weekends. Unpaid training would teach female engineers how to be more accurate and

rigorous in their coding" and "Workshops that teach female engineers how to present and defend their work more aggressively"). These two items were averaged to form a composite score for perceived effectiveness of female employees' self-change (r = .27, p < .001; M = 3.95, SD = 1.31).

After completing the dependent measures, participants completed a short anti-egalitarianism scale, composed of eight highly loading items from the Social Dominance Orientation (SDO_7) scale (Ho et al., 2015). The four contra-trait anti-egalitarianism items ("We should work to give all groups an equal chance to succeed," "We should do what we can to equalize conditions for different groups," "No matter how much effort it takes, we ought to strive to ensure that all groups have the same chance in life," and "Group equality should be our ideal) were reverse-coded and combined with the four pro-trait anti-egalitarianism items ("We should not push for group equality," "We shouldn't try to guarantee that every group has the same quality of life," "It is unjust to try to make groups equal," and "Group equality should not be our primary goal") to form a composite average score for anti-egalitarianism belief (M = 2.42, SD = 1.36). The scale achieved high reliability (α = .91) using the original 7-point scale (*1 – Strongly Oppose, 2 – Somewhat Oppose, 3 – Slightly Oppose, 4 – Neutral, 5 – Slightly Favor, 6 – Somewhat Favor, 7 – Strongly Favor*). Participants then were asked to explain the purpose of the study, as in prior studies. Finally, participants reported their gender and political orientation (*1 – Very Liberal, 7 – Very Conservative*). See Table 5 for the correlations among the variables of interest.

Results

Perceived Empowerment of Female Employees. Contrary to predictions, a one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure

of perceived empowerment of female engineers to tackle the gendered coding problem, $F(2, 327) = 0.55$, $p > .250$, partial $\eta^2 = .003$. Contrast analyses revealed that the internal barriers condition ($M = 4.62$, $SD = 1.30$) did not differ from baseline ($M = 4.64$, $SD = 1.18$), $F(1, 327) = 0.01$, $p > .250$, nor from the combined barriers condition ($M = 4.48$, $SD = 1.13$), $F(1, 327) = 0.73$, $p > .250$. The baseline condition and the combined barriers condition also did not differ on perceived empowerment, $F(1, 327) = 0.94$, $p > .250$.

Perceived Responsibility of Female Employees for a Solution to the Coding Problem. As predicted, a one-way Analysis of Variance (ANOVA) indicated that condition significantly affected attributions of female engineers' responsibility to address the gendered coding problem, $F(2, 327) = 5.90$, $p = .003$, partial $\eta^2 = 0.035$ (see Figure 7). Contrast analyses revealed that participants in the internal barriers condition held female engineers more responsible for solving the problem ($M = 4.20$, $SD = 1.44$) than did participants in the baseline condition ($M = 3.56$, $SD = 1.44$), $F(1, 327) = 11.46$, $p < .001$, or the combined barriers condition ($M = 3.78$, $SD = 1.36$), $F(1, 327) = 4.76$, $p = .029$. The baseline condition and the combined barriers condition did not differ on assignment of responsibility to female engineers, $F(1, 327) = 1.37$, $p = .242$.

Perceived Responsibility of Female Employees for Causing the Coding Problem. As predicted, a one-way Analysis of Variance (ANOVA) indicated that condition significantly affected attributions of female engineers' responsibility for causing the gendered coding problem, $F(2, 327) = 3.38$, $p = .035$, partial $\eta^2 = 0.02$ (see Figure 8). Contrast analyses revealed that participants in the internal barriers condition attributed a greater causal responsibility to female engineers for the problem ($M = 3.30$, $SD = 1.59$) than did participants in the baseline condition ($M = 2.79$, $SD = 1.54$), $F(1, 327) = 5.91$, $p = .015$, but not more than participants in the combined barriers condition ($M = 3.22$, $SD = 1.55$), $F(1, 327) = 0.15$, $p > .250$. Participants in the

combined barriers condition also attributed a greater causal responsibility to female engineers for the problem (M = 3.22, SD = 1.55) than did participants in the baseline condition, $F(1, 327)$ = 4.07, p = .044.

Perceived Effectiveness of Structural Change (vs. Female Employees' Self-Change). We also hypothesized that women's empowerment messages would decrease the perceived effectiveness of structural change at Facebook as a means to address the coding problem. As predicted, a one-way Analysis of Variance (ANOVA) indicated that condition significantly affected perceived effectiveness of structural change, $F(2, 327) = 4.09$, p = .018, partial η^2 = 0.024 (see Figure 9). Contrast analyses revealed that participants in the combined barriers condition perceived that changing the organizational structure is less effective (M = 5.42, SD = 1.24) than did participants in the baseline condition (M = 5.90, SD = 1.25), $F(1, 327) = 7.85$, p = .005. The internal barriers condition (M = 5.58, SD = 1.27) and the baseline condition differed on perceived effectiveness of structural change only to a marginal level of significance, $F(1, 327)$ = 3.61, p = .058; the internal barriers condition and the combined barriers condition did not differ on perceived effectiveness of structural change, $F(1, 327) = 0.87$, $p > .250$.

We hypothesized that women's empowerment messages would increase the perceived effectiveness of self-change as a means to address the gendered coding problem. As predicted, a one-way Analysis of Variance (ANOVA) indicated that condition significantly affected the perceived effectiveness of female engineers changing themselves via workshops and training, $F(2, 327) = 3.80$, p = .023, partial η^2 = 0.023 (see Figure 10). Contrast analyses revealed that participants in the internal barriers condition perceived that female engineers' self-change would be more effective (M = 4.11, SD = 1.33) than did participants in the baseline condition (M = 3.67, SD = 1.33), $F(1, 327) = 6.41$, p = .011. Similarly, participants in the combined barriers

condition perceived that female engineers' self-change would be more effective (M = 4.06, SD = 1.23) than did participants in the baseline condition, $F(1, 327) = 4.92$, $p = .027$. The internal barriers condition and the combined barriers condition did not differ on perceived effectiveness of self change, $F(1, 327) = 0.08$, $p > .250$.

Role of Anti-Egalitarianism Beliefs. To explore whether these effects might be stronger for participants who endorse anti-egalitarianism beliefs, we tested whether there were significant interactions between the condition manipulations and participants' SDO score, on all the possible dependent measures. None of these interactions was significant (all $p > .250$), providing initial evidence that women's empowerment messages elicit their effect among those who are pro- and anti-egalitarianism to the same extent.

Mediation Analyses. For exploratory purposes, we assessed whether attributions of women's responsibility for causing or solving the gendered coding problem acted as mediators on perceived effectiveness of the two types of interventions. These analyses examine whether one or the other process played a larger role in shaping preferences for interventions.

Analyses used regression for testing a mediation with a multi-categorical independent variable. We used the indicator coding approach (PROCESS Model 4; Hayes, 2013; Hayes & Preacher, 2014) and created two dummy variables (one for each condition: dummy code = 1 if a case is in the group and dummy code = 0 otherwise), using the baseline condition as the reference group (see Table 8 for details on indicator coding). We then estimated the relative indirect effects of each condition (internal barriers and combined barriers) compared to the baseline condition, using 95% bias-corrected bootstrap confidence intervals (with 10,000 bootstrap samples).

As shown in Figure 11, the mediation analysis looking at the effectiveness of structural change interventions revealed a significant relative indirect effect of the internal barriers (vs. baseline) condition via attributions of female engineers' responsibility for causing the gendered coding problem, b = -0.22, SE = 0.09, 95% CI = [-0.408, -0.042]. Responsibility of female engineers for solving the problem was not a significant mediator, b = -0.007, SE = 0.03, 95% CI = [-0.090, 0.053]. The analyses found a significant relative indirect effect of the combined barriers (vs. baseline) condition via attributions of female engineers' responsibility for causing the problem, b = -0.18, SE = 0.09, 95% CI = [-0.376, -0.010]. Responsibility of female engineers for solving the problem was not a significant mediator, b = -0.002, SE = 0.01, 95% CI = [-0.052, 0.018]. Next, we conducted the same mediation analysis but using the internal barriers condition as the reference group (see Table 8 for details on indicator coding). The relative indirect effect of the combined barriers (vs. internal barriers) condition via either of the two mediators was not significant ($b_{solving}$ = 0.005, SE = 0.02, 95% CI = [-0.035, 0.066]; $b_{causing}$ = 0.03, SE = 0.09, 95% CI = [-0.146, 0.219].

As shown in Figure 12, the mediation analysis looking at the effectiveness of female employees' self-change revealed a significant indirect effect of the internal barriers (vs. baseline) condition via responsibility of female engineers for solving the gendered coding problem, b = 0.11, SE = 0.06, 95% CI = [0.017, 0.276]. It also revealed a significant indirect effect of the internal barriers (vs. baseline) condition via attributions of female engineers' responsibility for causing the problem, b = 0.07, SE = 0.04, 95% CI = [0.009, 0.197]. We did not find a significant indirect effect of the combined barriers (vs. baseline) condition via responsibility of female engineers for solving the problem, b = 0.03, SE = 0.03, 95% CI = [-0.014, 0.154]. However, an indirect effect did emerge via attributions of female engineers' responsibility for causing the

problem, b = 0.06, SE = 0.04, 95% CI = [0.004, 0.174]. Next, we conducted the same mediation analysis but using the internal barriers condition as the reference group (see Table 8 for details on indicator coding). We found a significant relative indirect effect of the combined barriers (vs. internal barriers) condition via responsibility of female engineers to solve the problem, b = -0.07, SE = 0.05, 95% CI = [-0.211, -0.005], but not via attributions of female engineers' responsibility for causing the problem, b = -0.01, SE = 0.03, 95% CI = [-0.099, 0.042].

Discussion

Study 4 finds that, compared to the control condition (baseline), women's empowerment messages focusing solely on women's internal barriers led participants to attribute greater responsibility to female employees for both causing and solving a gender-related problem in the workplace. The combined barriers condition produced mixed results on these key dependent measures.

Study 4 also finds that women's empowerment messages affected the perceived effectiveness of interventions that place the onus on female employees to change themselves (vs. changing the upper management and the structure). Both the internal barriers and combined barriers conditions led participants to see the structure-change intervention as less effective, and the women's self-change intervention as more effective, compared to baseline. (One of these four comparisons was marginally significant.)

The mediational results tentatively suggest that responsibility for having caused the problem was more influential than was responsibility for solving the problem. To the extent that women's empowerment messages led participants to see women as having played a larger role in creating the gendered coding problem, they also tended to lead them to see structural interventions as less effective, and to see women changing themselves as more effective.

Unexpectedly, in contrast to Studies 2 and 3, Study 4 did not find that the empowerment messages succeeded at what they were apparently designed to do – affect perceptions of women's empowerment. This was a surprise; the empowerment effect is essentially a manipulation check. We are unsure of why it did not replicate here. Of course, even a high-powered set of studies (that report all experimental conditions, dependent variables, covariates, etc.) can produce some nonsignificant results (Schimmack, 2012; Simmons, Nelson, & Simonsohn, 2011).[14] Still, we speculate that perhaps this specific scenario context constrained perceptions of empowerment in some way.

Finally, Study 4 explored whether the effects of women's empowerment messages would depend on individuals' pro- or anti-egalitarian beliefs. It seemed possible to us that those who are motivated to see lower-status groups as deserving of their position might be more readily affected by these messages. We did not find any support for that idea; instead, the condition seemed to affect those high and low in SDO equally. We return to this issue in the General Discussion.

Study 5a

For our final two studies (5a and 5b), we sought to replicate the effects of Studies 2 and 3, in addition to exploring a novel question – whether one can convey women's empowerment to address inequality without eliciting negative attributions about women's responsibility for inequality. Studies 2 and 4 began to look at this question by using messages that combined the core women's empowerment theme with more traditionally feminist messages about the

[14] Because of the unexpected failure to find the empowerment effect in Study 4, we conducted a direct replication of Study 4. That direct replication found the same nonsignificant effect for empowerment; it replicated the effect on women's self-change interventions, structural interventions, and replicated the effect on responsibility for addressing but not for causing inequality. Data from this direct replication are included in the meta-analysis, and results are provided in full in Supplementary Online Materials.

structural and interpersonal barriers faced by women in the workplace. Based on the pattern of results in Studies 2 and 4, it seems that simply adding information about these external barriers does not suffice to avoid negative attributions about women's responsibility for workplace inequality.

One possible route to accomplish this goal is to tie individual barriers to the structural social factors that may predict their emergence. As Claro and colleagues (2016) explain, and as demonstrated by a wide literature in sociology (e.g., Elder, 1994) and developmental psychology (e.g., Bigler & Liben, 2007), "…structural inequalities can give rise to psychological inequalities and…those psychological inequalities can reinforce the impact of structural inequalities on achievement and future opportunity." Thus, although individuals may be able to improve their situation through their own action, that does not negate the causal role of broader social and systemic factors.

In the case of gender inequality in the workplace, for example, structural inequalities such as the under-representation of women in upper-level management may generate lower expectations and ambition among women for their own career success. Those lower expectations, in turn, may hurt their actual achievement. Indeed, Sandberg provides several examples of these types of causal connections between external and internal barriers in her book. For example, she notes, "The gender stereotypes introduced in childhood are reinforced throughout our lives and become self-fulfilling prophesies. Most leadership positions are held by men, so women don't expect to achieve them, and that becomes one of the reasons they don't." (Sandberg, 2013, p. 22). These more nuanced analyses, however, are not the core message of the book, and are neglected in popular media descriptions of this book and the broader ideology.

We speculated that messages that directly convey the interdependence of external and internal factors may reduce the interpretation that women are responsible for inequality. That being said, we also thought it possible that this type of message could weaken the manipulation's effect on empowerment, in that it may constrain perceptions that women could, for example, freely choose to have higher career expectations in the face of external information suggesting such expectations may be unrealistic.

Thus, in Studies 5a and 5b, we aimed to explore how messages that state that internal barriers are caused by external barriers would affect our same dependent measures. In addition to exploring this potential means to reduce the effects associated with women's empowerment messages, Studies 5a and 5b sought to replicate our previous studies. Specifically, Study 5a aimed to replicate the baseline (vs. internal barriers) effect (of Studies 2 and 4), and Study 5b aimed to replicate the baseline (vs. combined barriers) effect (of Studies 2 and 4) on our two main outcome variables (perceived responsibility for solving and causing gender inequality). We first present results testing our replication attempts, and then those related to testing whether the new condition (stating that internal barriers are *caused by* external barriers) reduces the effect of women's empowerment messages on perceptions of women's responsibility and contribution.

Method

Participants. We predetermined a sample size required to detect an intermediate effect ($f = 0.171$) to achieve adequate power ($1 - \beta > 0.80$) [given the average effect sizes of the manipulation on perceived empowerment of women in Studies 2 and 3].[15] This analysis indicated that we needed at least 333 participants for a three-cell design study. Data collection was stopped on the day that the minimum sample was obtained. Three hundred forty-nine United States

[15] If the power analyses used effect sizes for either responsibility for addressing or causing inequality instead, the required N would be 147 or 168.

residents were recruited online via Amazon's Mechanical Turk. As in Study 4, participants who correctly guessed the purpose of the study (N = 11; 3.15% of all recruited participants; e.g., one participant guessed that the study has "different speeches...testing to see if this influences the subsequent opinions on workplace issues") were excluded from analyses, leaving a total of 338 participants (M_{age} = 36.00, *SD* = 11.34; 56.5% female). The results below hold when including those eleven participants in the analyses. See Table 1 for additional demographic information.

Procedure and Materials. Participants were randomly assigned to one of three conditions (baseline vs. internal barriers vs. internal *by* external barriers). In the baseline condition (N = 123), participants read no text, and simply completed the dependent measures. In the internal barriers condition (N = 106), participants read the identical statements of internal barriers used in Studies 2 and 4.

In the internal *by* external barriers condition (N = 109), which is a new addition in Study 5a, participants read statements attributing women's internal barriers to the existing external barriers against women (e.g., "Women are hindered by barriers that exist within ourselves, which are the results of real obstacles women face in society and in the professional world, including blatant and subtle sexism, discrimination, and sexual harassment"). We created this new condition by adapting the internal barriers condition and external barriers condition from Studies 2, 3, 4, and 5a. In this new condition, every internal barrier was connected to and explained as the result of a corresponding external barrier (e.g., "These external barriers have, over time, led us [women] to hold ourselves back in ways both big and small…"; see Appendix F for full text). After reading their condition-specific text, participants in the internal barriers condition and the internal *by* external barriers condition answered the identical two-item filler questions about the speaker's communication style used in Study 4.

Next, participants moved to a new section of the study, explained to be about participants' understanding of workplace problems. All participants answered 16 workplace gender inequality questions, identical to those used in Study 3. All the items referenced "the problem of gender inequality in American workplaces." Four of the items measured perceived empowerment of women to tackle workplace gender inequality (α = .77; *M* = 4.99, *SD* = 1.06). Two of the items measured attributions of women's responsibility for solving the problem (*r* = .56, *p* < .001; *M* = 4.17, *SD* = 1.33). Two of the items measured attributions of women's responsibility for causing the problem (*r* = .60, *p* < .001; *M* = 3.33, *SD* = 1.48). All items were rated on a 7-point scale (*1 – Strongly Disagree, 7 – Strongly Agree*), and their order of presentation was randomized. Participants then were asked to explain the purpose of the study. Finally, participants reported their gender and political orientation (*1 – Very Liberal, 7 – Very Conservative*). See Table 6 for the correlations among the variables of interest.

Results

A. Replicating Prior Studies

For clarity of presentation, we begin by describing analyses just testing whether the previous effects replicate, that is, just comparing the two experimental conditions (baseline versus internal barriers) that were included in the earlier designs via t-tests of the between condition effect. Next, we add the new condition to the analyses and describe results related to the novel question in Study 5a—how directly stating that internal barriers are caused by external barriers affects the pattern.

Perceived Empowerment of Women. A between subjects t-test indicated that participants in the internal barriers condition saw women as more empowered (*M* = 5.14, *SD* = 1.08) than did participants in the baseline condition (*M* = 4.84, *SD* = 1.11), *t*(227) = 2.02, *p* = .044.

Perceived Responsibility of Women to Address Workplace Gender Inequality. A between subjects t-test indicated that participants in the internal barriers condition held women more responsible for solving workplace gender inequality (M = 4.38, SD = 1.35) than did participants in the baseline condition (M = 3.96, SD = 1.35), $t(227) = 2.35$, $p = .019$.

Perceived Responsibility of Women for Causing Workplace Gender Inequality. A between subjects t-test indicated that participants in the internal barriers condition attributed a greater causal responsibility to women for gender inequality (M = 3.67, SD = 1.33) than did participants in the baseline condition (M = 3.10, SD = 1.61), $t(227) = 2.91$, $p = .004$.

B. Analyses Including New Condition Directly Tying Internal to External Barriers

Perceived Empowerment of Women. A one-way Analysis of Variance (ANOVA) indicated that, across all three conditions, there was no significant effect on perceptions of women's empowerment to tackle workplace gender inequality, $F(2, 335) = 2.21$, $p = .111$, partial $\eta^2 = 0.013$. Although, as reported above, participants in the internal barriers condition saw women as more empowered (M = 5.14, SD = 1.08) than did participants in the baseline condition (M = 4.84, SD = 1.11), the internal *by* external barriers condition (M = 5.00, SD = 0.97) did not differ from the internal only condition, $F(1, 335) = 0.92$, $p > .250$, nor from the baseline condition, $F(1, 335) = 1.26$, $p > .250$. Thus, the new condition fell directly between the other two conditions and did not differ from either, suggesting that this text did not successfully increase perceptions of women's empowerment.

Perceived Responsibility of Women to Solve Workplace Gender Inequality. A one-way Analysis of Variance (ANOVA) indicated that, across all three conditions, there was a marginally significant effect on attributions of women's responsibility to address workplace gender inequality, $F(2, 335) = 2.93$, $p = .055$, partial $\eta^2 = 0.017$. The internal *by* external barriers

condition (M = 4.20, SD = 1.27) did not differ from the internal only condition (M = 4.38, SD = 1.35), $F(1, 335) = 0.99$, $p > .250$, nor from the baseline condition, (M = 3.96, SD = 1.35), $F(1, 335) = 1.93$, $p = .165$. Thus, again, the new condition fell directly between the other two conditions and did not significantly differ from either.

Perceived Responsibility of Women for Causing Workplace Gender inequality. A one-way Analysis of Variance (ANOVA) indicated that, across all three conditions, there was a significant effect on attributions of women's responsibility for causing workplace gender inequality, $F(2, 335) = 4.63$, $p = .010$, partial $\eta^2 = 0.027$. The internal *by* external condition (M = 3.25, SD = 1.41) did not differ from the baseline condition (M = 3.10, SD = 1.61), $F(1, 335) = 0.61$, $p > .250$. However, participants in the internal *by* external condition perceived that women had caused and contributed to the problem to a lesser extent than participants in the internal only condition (M = 3.67, SD = 1.33), $F(1, 335) = 4.54$, $p = .033$. Thus, the new condition did not differ from baseline, and did not lead to the same negative causal attributions as the internal only condition.

Study 5b

Study 5b used two different versions of the combined barriers messages (Studies 2 and 4) to compare to baseline – one identical to that used in Study 5a, and one that slightly modified that message to remove the explanatory link between external and internal barriers.

Participants. We predetermined a sample size required to detect an intermediate effect (f = 0.171) to achieve adequate power ($1 - \beta > 0.80$) [given the average effect sizes of the manipulation on perceived empowerment of women in Studies 2 and 3].[16] This analysis indicated that we needed at least 333 participants for a three-cell design study. Data collection was stopped

[16] If the power analyses used effect sizes for the two dependent variables instead, the required N would be 147 or 168.

on the day that the minimum sample was obtained. Three hundred fifty-six United States residents were recruited online via Amazon's Mechanical Turk. As in Studies 4 and 5a, participants who correctly guessed the purpose of the study (N = 12; 3.37% of all recruited participants) were excluded from analyses, leaving a total of 344 participants (M_{age} = 38.04, *SD* = 12.71; 61.0% female).[17] The results below hold when including those twelve participants in the analyses. See Table 1 for additional demographic information.

Method

Procedure and Materials. Participants were randomly assigned to one of three conditions (baseline vs. internal *by* external barriers vs. internal *and* external barriers). In the baseline condition (N = 123), participants read no text, and simply completed the dependent measures. The internal *by* external barriers condition (N = 110) was identical to that used in Study 5a. The internal *and* external barriers condition (N = 111) was a modification of the internal *by* external barriers condition (see Appendix F for full text). We sought to make as little change as possible so that the two conditions have the same types and numbers of barriers, but differ only in terms of whether the internal barriers are attributed to external barriers or not.

As in Studies 2, 4, and 5a, the texts participants read were ostensibly given by a highly respected female leader. After reading the background information and then their condition-specific text, participants answered the identical two-item filler questions of the speaker's communication style used in Studies 4 and 5a, which provided a rationale for reading the text.

Next, participants moved to a new section of the study, explained to be about participants' understanding of workplace problems. All participants answered the identical 16-item workplace gender inequality questions used in Studies 3 and 5a. All the items referenced

[17] One participant reported his/her gender as transgender.

"the problem of gender inequality in American workplaces." Four of the items measured perceived empowerment of women to tackle workplace gender inequality ($\alpha = .73$; $M = 5.14$, $SD = 0.94$). Two of the items measured attributions of women's responsibility for solving the problem ($r = .49$, $p < .001$; $M = 4.30$, $SD = 1.20$). Two of the items measured attributions of women's responsibility for causing the problem ($r = .60$, $p < .001$; $M = 3.18$, $SD = 1.41$). Items were again rated on a 7-point scale (*1 – Strongly Disagree, 7 – Strongly Agree*), and their order of presentation was randomized. Next, participants were asked to explain the purpose of the study. Finally, participants reported their gender and political orientation (*1 – Very Liberal, 7 – Very Conservative*). See Table 7 for the correlations among the variables of interest.

Results

A. Replicating Prior Studies

Perceived Empowerment of Women. A between subjects t-test revealed that participants in the internal *and* external barriers condition (i.e., a close analogue to the combined barriers condition of prior studies) saw women as more empowered ($M = 5.34$, $SD = 0.88$) than did participants in the baseline condition ($M = 5.07$, $SD = 0.93$), $t(232) = 2.24$, $p = .026$.

Perceived Responsibility of Women to Address Workplace Gender Inequality. A between subjects t-test revealed that participants in the internal *and* external barriers condition held women more responsible for solving workplace gender inequality ($M = 4.63$, $SD = 1.18$) than did participants in the baseline condition ($M = 4.08$, $SD = 1.20$), $t(232) = 3.56$, $p < .001$.

Perceived Responsibility of Women for Causing Workplace Gender Inequality. A between subjects t-test comparing baseline ($M = 3.15$, $SD = 1.49$) to the internal *and* external barriers condition ($M = 3.27$, $SD = 1.42$) indicated that condition did not significantly affect

attributions of women's causal responsibility for workplace gender inequality, $t(232) = 0.60$, $p > .250$.

B. Analyses Including New Condition Directly Tying Internal to External Barriers

Perceived Empowerment of Women. A one-way Analysis of Variance (ANOVA) indicated that, across all three conditions, condition significantly affected perceptions of women's empowerment to tackle workplace gender inequality, $F(2, 341) = 3.83$, $p = .023$, partial $\eta^2 = 0.022$ (see Figure 13). Participants in the internal *by* external barriers condition ($M = 5.02$, $SD = 0.99$) saw women as less empowered than participants in the internal *and* external barriers condition ($M = 5.34$, $SD = 0.88$), $F(1, 341) = 6.67$, $p = .010$, and did not differ from baseline ($M = 5.07$, $SD = 0.93$), $F(1, 341) = 0.23$, $p > .250$. Thus, the new condition failed to increase women's perceived empowerment over baseline.

Perceived Responsibility of Women to Address Workplace Gender Inequality. A one-way Analysis of Variance (ANOVA) indicated that, across all three conditions, condition significantly affected attributions of women's responsibility to address workplace gender inequality, $F(2, 341) = 6.93$, $p = .001$, partial $\eta^2 = 0.039$ (see Figure 14). Participants in the internal *by* external barriers condition held women less responsible for solving workplace gender inequality ($M = 4.21$, $SD = 1.15$) than those in the internal *and* external barriers condition ($M = 4.63$, $SD = 1.18$), $F(1, 341) = 7.01$, $p = .008$, and did not differ from baseline ($M = 4.08$, $SD = 1.20$), $F(1, 341) = 0.78$, $p > .250$. Thus, this version of the "internal *by* external" barriers condition looked more like the baseline, not producing negative attributions about women's role.

Perceived Responsibility of Women for Causing Workplace Gender Inequality. A one-way Analysis of Variance (ANOVA) indicated that, across all three conditions, condition did not significantly affect attributions of women's responsibility for causing workplace gender

inequality, $F(2, 341) = 0.28$, $p > .250$, partial $\eta^2 = 0.002$. The internal *by* external barriers condition ($M = 3.14$, $SD = 1.29$) did not differ from the internal *and* external barriers condition ($M = 3.27$, $SD = 1.42$), $F(1, 341) = 0.46$, $p > .250$, nor from baseline ($M = 3.15$, $SD = 1.49$), $F(1, 341) = 0.01$, $p > .250$. Baseline and internal *and* external barriers condition also did not differ, $F(1, 341) = 0.39$, $p > .250$.

Discussion

Studies 5a and 5b had two goals. First, they investigated whether the findings of prior studies would replicate, and found that results were largely consistent with prior studies. In five of six replication tests, the women's empowerment conditions (internal barriers only in 5a; combined barriers in 5b) led to the hypothesized results, replicating prior studies. Specifically, Study 5a found that, compared to baseline, women's empowerment messages (i.e., internal barriers only) led to attributions that women have greater responsibility for causing and solving workplace gender inequality. Study 5b found that, compared to baseline, a combination of internal barriers-messages and external barriers-messages increased attributions that women are responsible for solving, but not for causing, gender inequality.

The second goal of the studies was to examine how messages that tie internal barriers to their external precedents affect attributions. Both studies found that these new conditions (i.e., the internal *by* external barriers conditions) produced a weaker pattern of results, generally looking more like the baseline than the internal only (or internal *and* external barriers) conditions. That is, these conditions did not elicit the same negative attributions about women's role in gender inequality. However, these conditions also failed to elicit an increase in women's perceived empowerment to effect change. Thus, if the ideal intervention were to increase the individual's sense of his/her own agency while protecting the group from negative attributions

about responsibility (Claro et al., 2016; Okonofua Paunesku, & Walton, 2016), our attempt here fell short. On the other hand, it is perhaps encouraging that the negative implications of popular messages of women's empowerment can be countered by providing information that women's internal barriers to progress are themselves tied to broader structural obstacles.

General Discussion

The results of six studies largely support our hypotheses. In particular, the experimental studies (and a meta-analysis of six studies, reported in Supplementary Online Materials) showed that messages (text and audio) conveying women's ability to tackle workplace gender inequality by overcoming their own internal barriers led to perceptions that women have greater responsibility for said inequality – both for the problem itself, and for its solution (Brickman et al., 1982). These messages also led to greater endorsement of solutions that require women to change themselves as opposed to requiring companies or management to change.

One way to prevent these attribution tendencies was to explicitly state that external barriers against women, like network access and childcare responsibilities, give rise to internal barriers within women, like low confidence and low ambition (Studies 5a and 5b), although doing so also failed to increase perceptions that women are empowered to make change. Taken together, the findings indicate that cultural messages apparently aiming to empower women to take charge of their careers may ultimately result in negative attributions about women's responsibility for gender inequality.

Implications for Theory

The current research has implications for (a) basic attribution theory, (b) our understanding of gender inequality, (c) attributions about other forms of social inequality, and (d) interventions aiming to increase individual agency while minimizing victim blame.

Attribution theory and research. This work builds on basic research on attributions of responsibility. Attributions research has long suggested that observers rely on an actor's control over negative outcomes when assigning responsibility (Alicke, 2000, 2008; Frazier, 1990; Hafer & Bègue, 2005; Janoff-Bulman, Timko, & Carli, 1985; Schlenker et al., 1994; Shaver, 1985). For example, people tend to hold ill people more responsible if they believe the illness was caused by the sufferer's actions (e.g., smoking or sexual activity; Hafer & Bègue, 2005; Lerner, 1980; Marlow, Waller, & Wardle, 2010).

Our findings contribute to this literature in two ways. First, they show people's inclination to hold individuals responsible goes beyond their tendency to readily accept narratives about what caused the outcome, but may also apply to a tendency to infer responsibility from messages about who can solve or prevent a problem going forward. To understand this distinction, it may be useful to consider an example in a different context. Consider a working class family who was stricken with polluted water caused by a neighboring chemical plant. Classic models of attributing responsibility or blaming the victim would suggest that people would quickly embrace narratives that suggest past actions caused their plight: for example, stories that the family chose, despite advice, to move too close to the plant might be adopted as explanations for how they are partly responsible. But what if the narrative indicated that after the problem was discovered, the family learned they could potentially solve the problem by purchasing a costly barrier system for their property? Would learning about that potential solution – despite being costly and unproven – also lead people to increasingly see the family as responsible for the problem? This is, in effect, what we are observing in our studies.

Thus, our findings contribute to the basic attribution literature by suggesting that not only will people readily accept narratives around causality when offered, but even suggestions about

someone's power to solve a problem can lead to perceptions that a victim is responsible for the problem and its solution. In some circumstances, it may very well be morally reasonable to make this inference. For example, if someone can easily fix their broken arm by keeping it still but refuses to stop playing video games, that person is clearly contributing to the continuation of their problem despite not having originally caused the problem. In other cases, doing so may invite societally counterproductive attributions. In the specific case of gender inequality and women's empowerment messages, this inference may be especially problematic since the efficacy of these strategies for solving the problem is unproven.

Second, the current research also contributes to attribution research by illustrating how communications can elicit negative attributions while appearing to convey a positive, victim-friendly, message. Because women's empowerment messages are framed as feminist writings, apparently intended to improve gender equality, they are less likely to elicit cautious reactions from observers than would statements that explicitly state that women created the problem themselves (Czopp et al., 2015; Kay, Day, Zanna, & Nussbaum, 2013; Eagly & Mladinic, 1989; Glick & Fiske, 1996). Thus, unlike victim-blaming messages that directly hold disadvantaged groups responsible for their low status, messages that emphasize victims' self-improvement may result in the same outcome via a more palatable and positive-seeming approach. In a culture in which "victim-blaming" is increasingly recognized as a problem (Patten, 2016; Teitel, 2017; Walton, 2017), these pro-women messages may fly under the radar and elicit the same negative attributions without the risk of being accused of blaming the victim.

Gender Inequality. The current research also sheds light on Western culture's current approach to understanding gender inequality. The *Lean In* book, and related cultural messages about women's empowerment, reflect a popular version of feminism in recent years, in which an

individual woman's capitalistic success is viewed as the ultimate feminist accomplishment (Bellafante, 2017). Indeed, the national discourse is replete with examples of "feminist" role models, whose primary qualification is their own financial success (Filipovic, 2017; Gibson, 2016). In this context, it is worth noting that women's empowerment messages, with their de-emphasis on radical structural change and their suggestion that women "lean in" to work, may also reflect the dominance of corporate-friendly themes in American culture.

Interestingly, women's collective action, as opposed to individualized action, has recently become popular news again in the form of the #MeToo and #TimesUp movements (e.g., Barnes & Buckley, 2018; Zacharek, Dockterman, & Edwards, 2017). Demands for significant structural change regarding sexual harassment have taken the forefront in national conversations (Buckley, 2018; Chira & Einhorn, 2017). So far, this conversation has been largely limited to sexual abuse and harassment, but it is plausible that this conversation could move to address other forms of gender bias and inequality, leading to a pendulum swing away from women's empowerment messages and towards more structural and social change.

Other Forms of Social Inequality. Self-improvement or empowerment has been adopted or proposed as a solution to many other important social problems, such as crime, poverty, and low political participation (Cruikshank, 1999; Perkins, 1995). This discourse has shaped education programs for the mentally ill (Nelson, Lord, Ochocka, 2001), interventions for minority groups (Crossley, 2001), and programs to reduce child abuse and maltreatment (Prilleltensky, Nelson, & Peirson, 2001). Given the wide application and appeal of self-improvement/empowerment ideology, the current research may apply to other social contexts beyond workplace gender inequality.

For instance, at the end of the 19th century, many African-American leaders emphasized African-American's self-improvement and individual achievement as solutions to racial injustice (Cole & Omari, 2003). This "racial uplift" movement held that African-Americans, as a race, would progress when they embrace the culture and values of the White middle class (Gaines, 1996). Thus, like women's empowerment messages, the "racial uplift" approach assumes that African-Americans have "deficiencies" and need to "improve" themselves on traits associated with a more advantaged group. This movement was more explicit in its suggestions that the lower-status group should be the ones to do the work to reduce inequality, but similar processes to those examined here likely apply. Namely, to the extent that the movement suggested that African-Americans had the power to reduce inequality by addressing their own "internal barriers," it is likely that people perceived African-Americans as having caused their own inequality and as more responsible for addressing it going forward. These processes, in turn, would likely similarly result in reduced support for structural interventions and changes, and increased support for African-Americans changing themselves.

Thus, it is possible that the processes demonstrated here may also apply to other disadvantaged groups. That is, when cultural messages suggest a possible solution to social inequality, people's tendency may be to (a) interpret the potential solution as a prescription rather than a possibility, and (b) conflate the potential solution with the cause, assigning causal responsibility to those who have the power to alter the situation, even if they weren't involved in the origination of this inequality.

In Study 4, we made a first effort to explore the potential role of justification motives. Specifically, we examined whether anti-egalitarianism (Ho et al., 2015), a variable strongly associated with the motivation to maintain women's lower status in the social hierarchy (Pratto et

al., 2006), moderated the effects of the *Lean In* messages. We hypothesized that people high in antiegalitarianism might interpret women's empowerment messages as an implicit ideology that bolsters gender inequality, thus attributing a greater responsibility to women for both solving and causing the problem. Study 4 (and its direct replication, reported in Supplementary Online Materials) did not support this idea; instead, the manipulation equally affected those low and high in SDO. Given this null effect was unpredicted, we hesitate to overinterpret it. However, we offer the following speculations as food for thought. First, despite possible status-maintaining effects, *Lean In* messages are explicitly framed as designed to help women advance. As such, those who are motivated to limit women's advancement may not find them particularly appealing. Second, because *Lean In* messages do not emphasize any sort of zero-sum competition between women and men, the messages may not even be coded as hierarchy enhancing (or reducing) to people high in antiegalitarianism. As such, perhaps antiegalitarianism as measured by SDO will play a clearer moderating role with types of women's empowerment messages that more explicitly discuss the social hierarchy. Finally, it is also possible that because women's empowerment messages are so individualistic—focused on individualized actions and achievements—they are not construed as especially relevant to intergroup dynamics.

That being said, there are other contexts in which we suspect the effects of the *Lean In* messages might be likelier to emerge. First, they might emerge most readily when observers are motivated to understand the inequality as fair (Lerner, 1980). For instance, people who are motivated to believe in a just world (Lerner & Miller, 1978) might interpret the solution from women's empowerment messages not as a possibility, but as an indication that women already have choice and ample opportunities to advance their careers and address gender inequality. This interpretation, in turn, might lead to perceptions that women have greater responsibility for both

solving and creating the problem. Second, the *Lean In* effects may depend on a level of individualism in the broader culture; given that those from collectivistic cultures tend not to over-estimate the actor's responsibility for outcomes (Menon et al., 1999), they may be similarly less receptive to messages that encourage individual solutions to societal problems. Future studies should further explore the potential role of these justification motives.

Interventions in Social Inequality. Finally, the current research has relevance to scholars and practitioners aiming to develop effective treatments and interventions for individuals whose outcomes relate to broader social and structural problems or inequalities (Triantafillou & Nielson, 2001). In such cases, empowering the individual to make changes to his or her own circumstances is desirable and worthwhile, but the current findings suggest that there may also be risks and drawbacks associated with said empowerment messages. Teaching a student behavioral and cognitive strategies to navigate a poorly funded school system may help that student succeed. However, if doing so communicates to students that they should not expect or demand a better school system, then overall such teachings may be harmful. Given this, how do social scientists convey that individuals can help themselves without then giving those individuals the burden of more responsibility for doing so? In Studies 5a and 5b, we attempted to more directly tie women's internal barriers to external social structures. However, our results were mixed – the condition was not as negative in terms of attributions about women as were the original experimental conditions, but it also failed to successfully manipulate perceptions that women were empowered. Future research should continue to explore how we can simultaneously pursue structural and individual solutions to social problems.

Limitations

Methodologically, this work has some clear limitations. First, all samples in the present research were collected from various online survey platforms (Prolific Academic, Amazon's Mechanical Turk). These venues have demographically diverse participants (Buhrmester et al., 2011; Peer et al., 2017), but some evidence suggests that Mechanical Turkers are different from the general population in certain aspects (e.g., Arditte, Çek, Shaw, & Timpano, 2016), and certainly, this reliance on online survey platforms is a weakness of our research and limits its generalizability. Second, the work relied exclusively on the most prominent example of women's empowerment ideology, *Lean In*, and may thus not apply to all such messages.

Third, this research is also limited by its source material's focus on white professional women. Americans do not hold the same stereotypes about all women, regardless of race, ethnic group, or religion (Sanchez-Hucles & Davis, 2010). Indeed, stereotypes of women as being low in assertiveness are not held uniformly for women of all racial and cultural groups (e.g., Parker & Ogilvie, 1996). In addition, many women face completely different workplace challenges; for those in lower-wage positions and non-professional contexts, it is unclear how the strategies suggested in women's empowerment messages would be applicable. Future work should explore these messages' influence on perceptions of other groups of women.

Future Directions

This work raises several interesting questions for future research. First, it would be useful to know whether and how these tendencies apply in other cultures. The broader self-improvement literature, of which this new form of women's feminism is a sub-part, is popular not only in America but also in other countries and cultures, such as those in Europe and East Asia (Bergsma, 2008). Indeed, Sandberg's *Lean In* messages were well received overseas, earning broad coverage in the media in Europe and Asia (e.g., Tatlow, 2013). Thus, it is possible

that similar attribution tendencies might be observed with samples recruited outside the U.S. However, it is also possible that these women's empowerment messages may vary significantly across cultures (e.g., Henrich, Heine, & Norenzayan, 2010). For instance, because such messages are framed as individual action (e.g., Rottenberg, 2014), they may be particularly appealing to people from cultures that emphasize an independent (vs. interdependent) view of the self (Markus & Kitayama, 1991). Future research should also consider social class (Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012; Stephens, Markus, & Townsend, 2007) as a potential moderating variable. Compared to middle- and upper-class individuals, working-class individuals regulate their behavior according to interdependent norms, such as adjusting to others' needs and being part of a community (Stephens, Fryberg, & Markus, 2011; Stephens, Hamedani, Markus, Bergsieker, & Eloul, 2009). Women's empowerment messages, focused on achieving success as individuals, may thus be less influential for members of the working class.

Second, it would be interesting to further explore the consequences of such messages for moral attributions. It is unclear from the existing findings whether people will hold women *morally* culpable for workplace gender inequality. For instance, will exposure to women's empowerment messages lead people to explicitly blame women (e.g., Alicke, 2008) and hold them morally responsible (e.g., Pizarro, Uhlmann, & Salovey, 2003)? Would people respond to women's failure to "lean in" with disgust emotions and other common reactions to moral violations (e.g., Haidt, Rozin, McCauley, & Imada, 1997)? Although causality, responsibility, and moral blame are often treated interchangeably (Schlenker et al., 1994; Zucker & Weiner, 1993), attribution theories (Alicke, 2000; Heider, 1958; Shaver, 1985; Weiner, 1995) and empirical evidence (Mantler, Schellenberg, & Page, 2003; Reisenzein 1986; Williams, Lees-Haley, & Price, 1996) suggest that they are semantically and theoretically distinct concepts. For

instance, women may be perceived to be responsible for addressing gender inequality not because they are morally blameworthy but because they better understand the problem, because no one else is going to undertake the task, or because they are the ones to benefit from equality. Similarly, although causal attribution is closely related to blaming (Alicke, 2000), people may be reluctant to explicitly blame women for gender inequality.

Third, the focus of the current manuscript was on attributions about women's responsibility for gender inequality. However, we also measured men's responsibility in all studies, and found no consistent pattern of effects. (See Supplementary Online Materials for all findings.) It is possible that such null findings simply reflect the salience of women in Sandberg's messaging. However, it is also possible that people do not see responsibility for inequality as zero sum, and are willing to attribute greater responsibility to women while not reducing their perceptions of men's responsibility. Future studies should explore the relation of attributions about the role of advantaged and disadvantaged groups in inequality, and seek to better understand what kind of messages might affect attributions about the role men have to play in gender inequality specifically.

Fourth, we have consistently found a weaker condition effect on perceived empowerment of women than on perceived responsibility of women for causing and for solving gender inequality (Studies 2, 3, 5a, and 5b). These differences might be due to people's general tendency to report higher beliefs of women's empowerment. Indeed, the mean of this rating is consistently higher than that of other perceptions of women in all our studies. It is also possible that empowerment is a socially desirable (Crowne & Marlowe, 1960) trait to assume in others. Consistent with this interpretation, a correlational study (Study 1) found that social desirability is

positively and significantly correlated with perceptions of women's empowerment, but not with other variables. Future research should explore these possibilities.

Finally, there are a number of other issues raised by this work. For example, how important is the message's emphasis on internal (vs. external) obstacles, relative to their emphasis on future change, versus past action? Future studies manipulating a past versus future focus would help reveal the extent to which developmental improvement is key to these messages' effects. Similarly, how would people respond to empowering messages about external obstacles, such as messages about improving the workplace via collective action? It would also be interesting to explore the effects of these messages on benevolent sexism (Glick & Fiske, 1996). By portraying women as able to tackle this problem, these messages may challenge the view that women are passive and dependent on men for help. It would also be useful to explore moderating variables. For example, the messages' focus on individual achievement (over collective struggle) may be less persuasive to women who score high on gender identification. Research suggests that strong group identification predicts support for collective action for the group (Becker, Tausch, Spears, & Christ, 2011; Klandermans, 2002). Thus, women who identify strongly with their gender may not be as strongly affected by these cultural messages. As another example, people who value qualities like human potential (e.g., Sennett, 2007) and self-realization (e.g., Rimke, 2000; Robbins, 2007) may be more receptive to women's empowerment messages. With their interest in self-improvement, such people may have stronger beliefs in women's ability for self-change; as a result, they may come to believe more strongly that women can and should take care of these problems on their own.

Concluding Remarks

"We hold ourselves back in ways both big and small, by lacking self-confidence, by not raising our hands and by pulling back when we should be leaning in." (Sandberg, 2014, p. 8).

"The time is long overdue to encourage more women to dream the possible dream." (Sandberg, 2014, p. 11).

These messages, like others in the women's empowerment movement, can inspire and motivate women. Indeed, messages that support individual women's career advancement have a valuable place in any effort to improve gender relations in the workplace. However, the current results suggest that caution is in order, as such messages may have consequences for the understanding of who is responsible for creating the problem, and who is responsible for its solution. When society points to how women *can* change – they can dream bigger, talk louder – it also points to who and what *should* change. Now, if it turns out that dreaming bigger and speaking more loudly will solve gender inequality, these results are perhaps no cause for concern. However, if structural and societal change is also needed, these results should worry those who seek gender equality in the workplace.

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Appendix A

Attention Check (Studies 1 and 2; adapted from Hemingway, 1987)

(*Ebro, Chicago, Barcelona, Argon, or Madrid*)

The hills across the valley of the Ebro were long and white. On this side there was no shade and no trees and the station was between two lines of rails in the sun. Close against the side of the station there was the warm shadow of the building and a curtain, made of strings of bamboo beads, hung across the open door into the bar, to keep out flies. It was very hot and the express from Barcelona came and stopped at this junction for two minutes and went on to Madrid.

What was the destination of the express train?

Appendix B

Perceptions of Gender Inequality in American Workplaces (Studies 1 and 2)

"The following questions concern the problem of gender inequality in American workplaces. To what extent do you agree or disagree with the following statements?"

(*1 – Strongly Disagree, 7 – Strongly Agree*)

1. Women have power to address the problem.
2. Women are best able to tackle the problem.
3. Women are capable of dealing with the problem.
4. Women have potential to solve the problem.
5. Women should do the work to fix the problem.
6. Women are responsible for solving the problem.
7. Women have caused the problem.
8. Women have contributed to the problem.
9. Men have power to address the problem.
10. Men are best able to tackle the problem.
11. Men are capable of dealing with the problem.
12. Men have potential to solve the problem.
13. Men should do the work to fix the problem.
14. Men are responsible for solving the problem.
15. Men have caused the problem.
16. Men have contributed to the problem.

Appendix C

Abridged Social Desirability Scale (Study 1; adapted from Crowne & Marlowe, 1960)

(*True, False*)

1. I am always careful about my manner of dress.
2. No matter who I'm talking to, I'm always a good listener.
3. I'm always willing to admit it when I make a mistake.
4. I am always courteous, even to people who are disagreeable.
5. It is sometimes hard for me to go on with my work if I am not encouraged. (reverse-coded)
6. I sometimes feel resentful when I don't get my way. (reverse-coded)
7. I like to gossip at times. (reverse-coded)
8. There have been times when I was quite jealous of the good fortune of others. (reverse-coded)

Appendix D

Text Manipulation (Studies 2 and 4)

Text of the background information

In recent interviews, Nancy Sullivan, a highly respected woman who is also an expert in her field, has given the following statements about gender inequality in American workplaces:

The blunt truth is that men still run the world. Of the 195 independent countries in the world, only 17 are led by women. Women hold just 20 percent of seats in parliaments globally. In the United States, where we pride ourselves on liberty and justice for all, the gender division of leadership roles is not much better. Women became 50 percent of the college graduates in the United States in the early 1980s. Since then, women have slowly and steadily advanced, earning more and more of the college degrees, taking more of the entry-level jobs, and entering more fields previously dominated by men.

Despite these gains, the percentage of women at the top of corporate America has barely budged over the past decade. A meager twenty-one of the Fortune 500 CEOs are women. Women hold about 14 percent of executive officer positions, 17 percent of board seats, and constitute 18 percent of our elected congressional officials. The gap is even worse for women of color, who hold just 4 percent of top corporate jobs, 3 percent of board seats, and 5 percent of congressional seats. While women continue to outpace men in educational achievement, we have ceased making real progress at the top of any industry. This means that when it comes to making the decision that most affect our world, women's voices are not heard equally. Progress remains

equally sluggish when it comes to compensation. In 1970, American women were paid 59 cents for every dollar their male counterparts made. By 2010, women had protested, fought, and worked their butts off to raise that compensation to 77 cents for every dollar men made.

A truly equal world would be one where women ran half our countries and companies and men ran half our homes. I believe that this would be a better world. Conditions for all women will improve when there are more women in leadership roles giving strong and powerful voice to their needs and concerns.

This brings us to the obvious question-how? How are we going to take down the barriers that prevent more women from getting to the top?

Text of the external barriers condition

Women face real obstacles in the professional world, including blatant and subtle sexism, discrimination, and sexual harassment. Too few workplaces offer the flexibility and access to child care and parental leave that are necessary for pursuing a career while raising children. Men have an easier time finding the mentors and sponsors who are invaluable for career progression. Plus, women have to prove themselves to a far greater extent than men do. And this is not just in our heads. A 2011 McKinsey report noted that men are promoted based on potential, while women are promoted based on past accomplishments.

Text of the internal barriers condition

Women are hindered by barriers that exist within ourselves. We hold ourselves back in ways both big and small, by lacking self-confidence, by not raising our hands, and by pulling back when we should be leaning in. We internalize the negative messages we get throughout our lives-the messages that say it's wrong to be outspoken, aggressive, more powerful than men. We lower our own expectations of what we can achieve. We continue to do the majority of the housework and child care. We compromise our career goals to make room for partners and children who may not even exist yet. Compared to our male colleagues, fewer of women aspire to senior positions. This is not a list of things other women have done. I have made every mistake on this list. At times, I still do. My argument is that getting rid of these internal barriers is critical to gaining power.

Text of the combined barriers condition

Women face real obstacles in the professional world, including blatant and subtle sexism, discrimination, and sexual harassment. Too few workplaces offer the flexibility and access to child care and parental leave that are necessary for pursuing a career while raising children. Men have an easier time finding the mentors and sponsors who are invaluable for career progression. Plus, women have to prove themselves to a far greater extent than men do. And this is not just in our heads. A 2011 McKinsey report noted that men are promoted based on potential, while women are promoted based on past accomplishments. In addition to the external barriers erected by society, women are hindered by barriers that exist within ourselves. We hold ourselves back in ways both big and small, by lacking self-confidence, by not raising our hands, and by pulling back when we should be leaning in. We internalize the negative messages we get throughout our lives-the messages that say it's wrong to be outspoken, aggressive, more powerful than men. We

lower our own expectations of what we can achieve. We continue to do the majority of the housework and child care. We compromise our career goals to make room for partners and children who may not even exist yet. Compared to our male colleagues, fewer of women aspire to senior positions. This is not a list of things other women have done. I have made every mistake on this list. At times, I still do. My argument is that getting rid of these internal barriers is critical to gaining power.

Appendix E

Speech Manipulation (Study 3)

Transcript/closed caption of the background information

The problem is this: Women are not making it to the top of any profession anywhere in the world. The numbers tell the story quite clearly. 190 heads of state – nine are women. Of all the people in parliament in the world, 13 percent are women. In the corporate sector, women at the top, C-level jobs, board seats – tops out at 15, 16 percent. The numbers have not moved since 2002 and are going in the wrong direction. So the question is, how are we going to fix this? How do we change these numbers at the top? How do we make this different?

Transcript/closed caption of the external barriers condition

(https://www.youtube.com/watch?v=-fWb7fjj0Mc)

If a woman and a man work full-time and have a child, the woman does twice the amount of housework the man does, and the woman does three times the amount of childcare the man does. So she's got three jobs or two jobs, and he's got one. Who do you think drops out when someone needs to be home more? And that's a problem, because we have to make it as important a job, because it's the hardest job in the world to work inside the home, for people of both genders. All over the world, no matter what our cultures are, we think men should be strong, assertive, aggressive, have voice; we think women should speak when spoken to, help others. Now we have, all over the world, women are called "bossy." There is a word for "bossy," for little girls, in every language there's one. It's a word that's pretty much not used for little boys, because if a little boy leads, there's no negative word for it, it's expected. But if a little girl leads, she's bossy.

Now, do we think women are more aggressive than men? Of course not. It's just that we judge them through a different lens, and a lot of the character traits that you must exhibit to perform at work, to get results, to lead, are ones that we think, in a man, he's a boss, and in a woman, she's bossy.

Transcript/closed caption of the internal barriers condition

(https://www.youtube.com/watch?v=l2vwig3f1f8)

I want to start out by saying, I talk about this – about keeping women in the workforce – because I really think that's the answer. In the high-income part of our workforce, in the people who end up at the top – Fortune 500 CEO jobs, or the equivalent in other industries – the problem, I am convinced, is that women are dropping out. I want to focus on what we can do as individuals. What are the messages we need to tell ourselves? What are the messages we tell the women that work with and for us? What are the messages we tell our daughters? Women systematically underestimate their own abilities. If you test men and women, and you ask them questions on totally objective criteria like GPAs, men get it wrong slightly high, and women get it wrong slightly low. Women do not negotiate for themselves in the workforce. A study in the last two years of people entering the workforce out of college showed that 57 percent of boys entering, or men, I guess, are negotiating their first salary, and only seven percent of women. And most importantly, men attribute their success to themselves, and women attribute it to other external factors. Everywhere in the world, women need more self-confidence, because the world tells us we're not equal to men. We assume men can do it all, slash – have jobs and children. We assume women can't and that's ridiculous, because the great majority of women everywhere in the world, including the United States, work full time and have children.

Appendix F

Text Manipulation

Text of the internal *by* external barriers (i.e., internal barriers *caused by* external barriers) condition (Studies 5a and 5b)

Women are hindered by barriers that exist within ourselves, which are the results of real obstacles women face in society and in the professional world, including blatant and subtle sexism, discrimination, and sexual harassment. These external barriers have, over time, led us to hold ourselves back in ways both big and small, by lacking self-confidence, by not raising our hands, and by pulling back. We get negative messages throughout our lives -- the messages that expect (and encourage) men to be outspoken, aggressive, and more powerful, while saying it's wrong for women to seek the same traits, encouraging women to instead only speak when spoken to and help others. Because too few workplaces offer the flexibility and access to child care and parental leave that are necessary for pursuing a career while raising children, women continue to do the majority of the housework and child care, and compromise our career goals to make room for partners and children who may not even exist yet. Because men have an easier time finding the mentors and sponsors who are invaluable for career progression, compared to our male colleagues, fewer women aspire to senior positions. Plus, because women have to prove themselves to a far greater extent than men do, women lower our own expectations of what we can achieve.

Text of the internal *and* external barriers condition (Study 5b)

Women are hindered by barriers that exist within ourselves and by real obstacles we face in society and in the professional world. We hold ourselves back in ways both big and small, by lacking self-confidence, by not raising our hands, and by pulling back. We also face external barriers, such as blatant and subtle sexism, discrimination, sexual harassment, along the messages that expect (and encourage) men to be outspoken, aggressive, and more powerful, while saying it's wrong for women to seek the same traits, encouraging women to instead only speak when spoken to and help others. There are too few workplaces offering the flexibility and access to child care and parental leave that are necessary for pursuing a career while raising children, and women continue to do the majority of the housework and child care. Women too often compromise our career goals to make room for partners and children who may not even exist yet. Men have an easier time finding the mentors and sponsors who are invaluable for career progression. Fewer women aspire to senior positions, compared to our male colleagues. Plus, not only do women have to prove themselves to a far greater extent than men do, but women also lower our own expectations of what we can achieve.

Table 1. Demographics for Studies 1, 2, 3, 4, 5a, and 5b

	Age	Ethnicity (%)	Education (%)	Political Orientation
Study 1	*M* = 33.82 *SD* = 12.05	Hispanic - 4.2 Black or African American - 2.1 Asian - 7.4 Asian American or Pacific Islander - 1.1 Native American or Alaska Native - 1.1 Caucasian - 82 Other - 2.1	Some High School - 1.4 High School Graduate - 10.2 Some College - 25.4 College Graduate - 45.4 Some Post Graduate - 6.7 Post Graduate Degree - 10.9	*M* = 3.55 *SD* = 2.05
Study 2	*M* = 34.36 *SD* = 11.06	Hispanic - 7.0 Black or African American - 7.7 Asian - 6.4 Asian American or Pacific Islander - 1.6 Native American or Alaska Native - 0.2 Caucasian - 75.9 Other - 1.1	Some Middle School - 0.2 Some High School - 0.5 High School Graduate - 8.0 Some College - 31.4 College Graduate - 39.7 Some Post Graduate - 4.3 Post Graduate Degree - 15.9	*M* = 3.34 *SD* = 1.58
Study 3	*M* = 37.27 *SD* = 12.99	Hispanic - 7.2 Black or African American - 9.3 Asian - 5.7 Asian American or Pacific Islander - 1.0 Native American or Alaska Native - 0.5 Caucasian - 73.2 Other - 3.1	Some High School - 0.5 High School Graduate - 8.7 Some College - 28.9 College Graduate - 45.4 Some Post Graduate - 5.7 Post Graduate Degree - 10.8	*M* = 3.36 *SD* = 1.73

Study 4	*M* = 35.11 *SD* = 11.94	Hispanic - 6.7 Black or African American - 8.8 Asian - 10.6 Asian American or Pacific Islander - 0.9 Native American or Alaska Native - 0.3 Caucasian - 71.2 Other - 1.5	Some High School - 0.3 High School Graduate - 10.3 Some College - 35.5 College Graduate - 39.4 Some Post Graduate - 3.9 Post Graduate Degree - 10.6	*M* = 3.32 *SD* = 1.59
Study 5a	*M* = 36.00 *SD* = 11.34	Hispanic - 8.0 Black or African American - 8.9 Asian - 5.6 Asian American or Pacific Islander - 0.3 Native American or Alaska Native - 0.3 Caucasian - 74.9 Other - 2.1	Some High School - 0.6 High School Graduate - 11.2 Some College - 32.5 College Graduate - 42.6 Some Post Graduate - 5.0 Post Graduate Degree - 8.0	*M* = 3.41 *SD* = 1.70
Study 5b	*M* = 38.04 *SD* = 12.71	Hispanic - 2.6 Black or African American - 9.0 Asian - 5.2 Asian American or Pacific Islander - 0.9 Native American or Alaska Native - 0.6 Caucasian - 78.5 Other - 3.2	Some High School - 0.9 High School Graduate - 8.7 Some College - 28.8 College Graduate - 44.8 Some Post Graduate - 2.9 Post Graduate Degree - 14.0	*M* = 3.34 *SD* = 1.78

Political orientation (*1 – Very Liberal, 7 – Very Conservative*).

Table 2. Correlations among the variables of interest in Study 1

	1	2	3	4	5	6	7	8
1. Participant Gender	–							
2. Political orientation	-.07	–						
3. Social desirability	.01	.009	–					
4. Women's empowerment	.11	-.08	.19**	–				
5. Women's responsibility for solving the problem	.03	.09	.11	.52**	–			
6. Women's causal responsibility for the problem	-.15**	.42**	-.02	.008	.35**	–		
7. Men's empowerment	.06	-.14*	.06	.33**	.12*	-.25**	–	
8. Men's responsibility for solving the problem	.09	-.29**	.05	.15**	.05	-.30**	.57**	–
9. Men's causal responsibility for the problem	.14*	-.45**	-.01	.07	-.11	-.42**	.46**	.63**

Note: Participant gender (*0 = Male, 1 = Female*). Political orientation (*1 – Very Liberal, 7 – Very Conservative*). * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 3. Correlations among the variables of interest in Study 2

	1	2	3	4	5	6	7
1. Participant Gender	–						
2. Political orientation	-.12**	–					
3. Women's empowerment	.13**	-.02	–				
4. Women's responsibility for solving the problem	.09*	.09	.57**	–			
5. Women's causal responsibility for the problem	-.04	.19**	.25*	.50**	–		
6. Men's empowerment	.08	-.22**	.30**	.06	-.11*	–	
7. Men's responsibility for solving the problem	.06	-.16**	.09*	.08	-.17**	.56**	–
8. Men's causal responsibility for the problem	.11*	-.32**	.25**	.08	-.18**	.50**	.62**

Note: Participant gender (*0 = Male, 1 = Female*). Political orientation (*1 – Very Liberal, 7 – Very Conservative*). * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 4. Correlations among the variables of interest in Study 3

	1	2	3	4	5	6	7
1. Participant Gender	–						
2. Political orientation	.04	–					
3. Women's empowerment	.27**	.03	–				
4. Women's responsibility for solving the problem	.22**	.01	.64**	–			
5. Women's causal responsibility for the problem	06	.22**	.30**	.48**	–		
6. Men's empowerment	.06	-.22**	.13	.006	-.17*	–	
7. Men's responsibility for solving the problem	-.01	-.31**	-.02	-.07	-.17*	.61**	–
8. Men's causal responsibility for the problem	.05	-.29**	.09	-.06	-.18*	.59**	.63**

Note: Participant gender (*0 = Male, 1 = Female*). Political orientation (*1 – Very Liberal, 7 – Very Conservative*). * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 5. Correlations among the variables of interest in Study 4

	1	2	3	4	5	6	7	8	9
1. Participant Gender	–								
2. Political orientation	-.03	–							
3. Women's empowerment	.06	.04	–						
4. Women's responsibility for solving the problem	-.07	.24**	.47**	–					
5. Women's causal responsibility for the problem	-.15**	.30**	.25**	.64**	–				
6. Men's empowerment	.05	-.09	.12*	.04	-.09	–			
7. Men's responsibility for solving the problem	.04	-.13*	.006	.06	-.08	.61**	–		
8. Men's causal responsibility for the problem	.14**	-.24**	.08	.0003	-.14**	.42**	.68**	–	
9. Perceived effectiveness of structural change	.25**	-.21**	-.001	-.36**	-.55**	.19**	.13*	.22**	–
10. Perceived effectiveness of self-change	-.07	.10	.05	.31**	.30**	.09	-.03	-.01	-.08

Note: Participant gender (*0 = Male, 1 = Female*). Political orientation (*1 – Very Liberal, 7 – Very Conservative*). * $p < .05$, two-tailed.
** $p < .01$, two-tailed.

Table 6. Correlations among the variables of interest in Study 5a

	1	2	3	4	5	6	7
1. Participant Gender	–						
2. Political orientation	.01	–					
3. Women's empowerment	.11*	.01	–				
4. Women's responsibility for solving the problem	-.05	.14**	.49**	–			
5. Women's causal responsibility for the problem	-.09	.26**	.15**	.43**	–		
6. Men's empowerment	.12*	-.20**	.35**	.07	-.09	–	
7. Men's responsibility for solving the problem	.05	-.33**	.16**	.07	-.16**	.60**	–
8. Men's causal responsibility for the problem	.10	-.43**	.24**	.005	-.20**	.59**	.68**

Note: Participant gender (*0 = Male, 1 = Female*). Political orientation (*1 – Very Liberal, 7 – Very Conservative*). * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 7. Correlations among the variables of interest in Study 5b

	1	2	3	4	5	6	7
1. Participant Gender	–						
2. Political orientation	-.05	–					
3. Women's empowerment	.10*	.05	–				
4. Women's responsibility for solving the problem	-.005	.10	.47**	–			
5. Women's causal responsibility for the problem	-.09	.29**	.06	.29**	–		
6. Men's empowerment	.12*	-.16**	.18**	.03	-.08	–	
7. Men's responsibility for solving the problem	-.005	-.25**	.04	.04	-.12*	.56**	–
8. Men's causal responsibility for the problem	.09	-.33**	.13*	.02	-.17**	.47**	.65**

Note: Participant gender (*0 = Male, 1 = Female*). Political orientation (*1 – Very Liberal, 7 – Very Conservative*). * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 8. Indicator coding for Study 4.

	The reference group = The baseline condition.		
	Baseline	Internal Barriers	Combined Barriers
D_1	0	1	0
D_2	0	0	1

	The reference group = The internal barriers condition.		
	Internal Barriers	Baseline	Combined Barriers
D_1	0	1	0
D_2	0	0	1

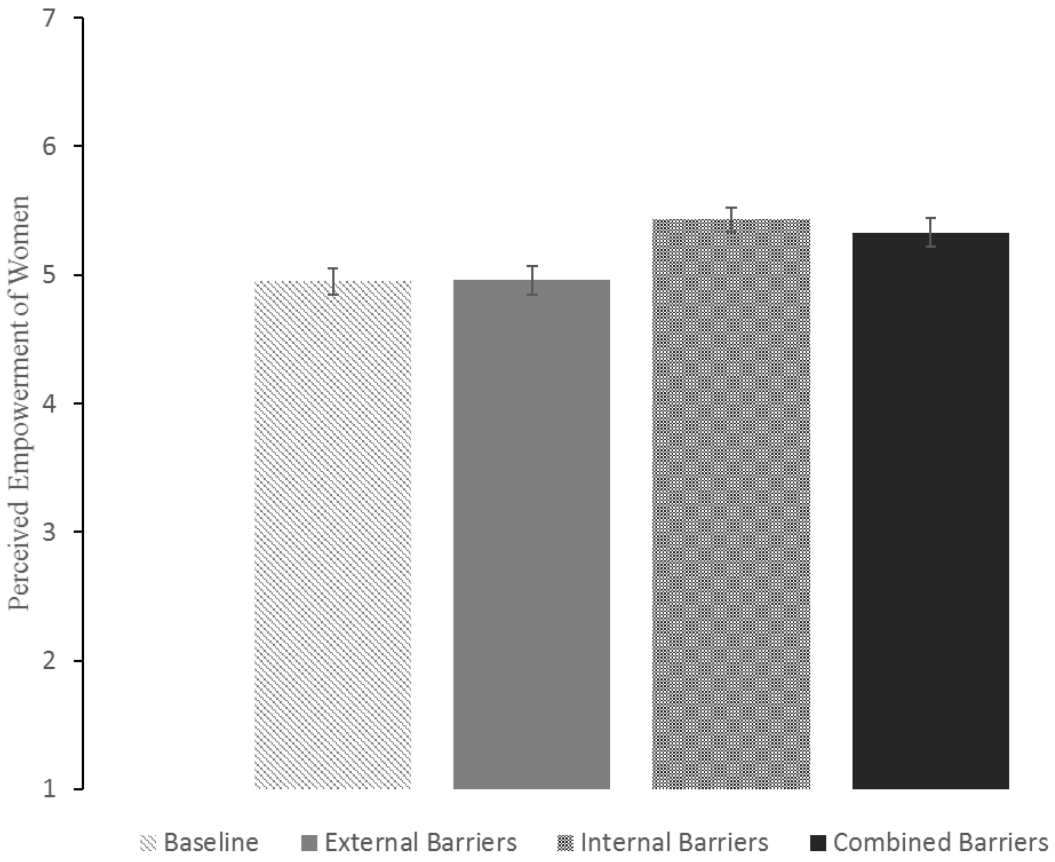

Figure 1. Results from Study 2: Effect of condition on perceived empowerment of women (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

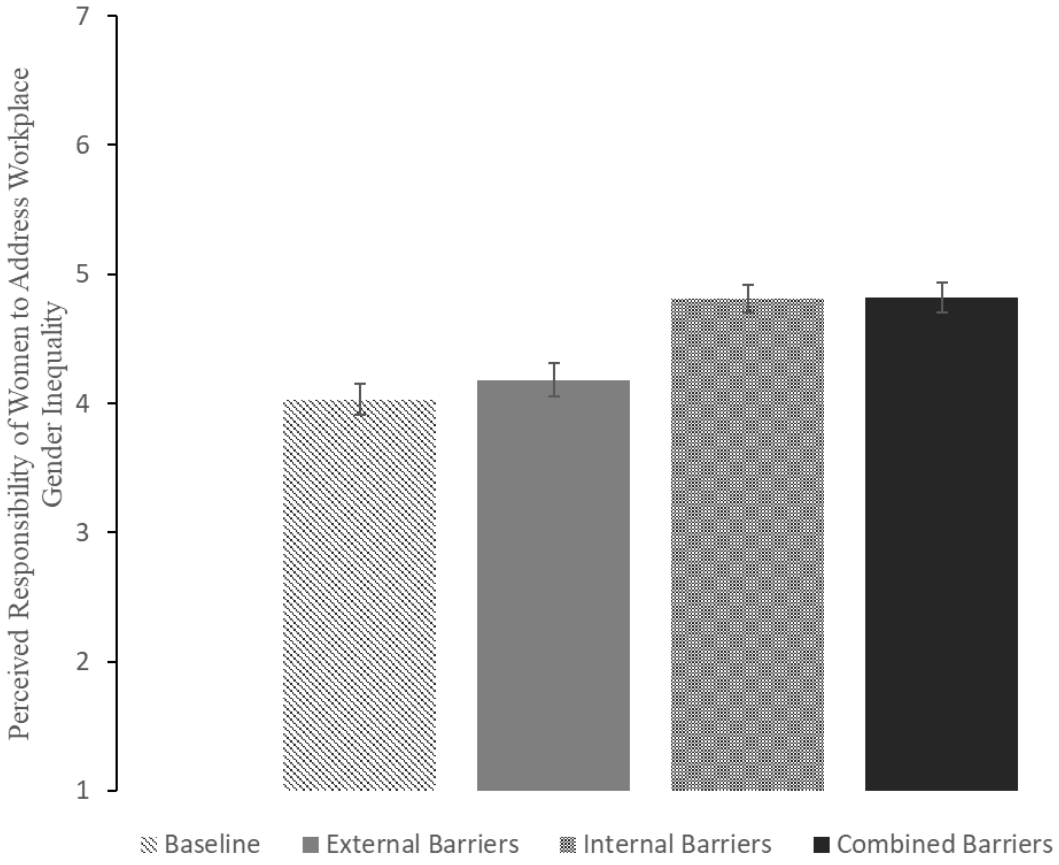

Figure 2. Results from Study 2: Effect of condition on perceived responsibility of women to address workplace gender inequality (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

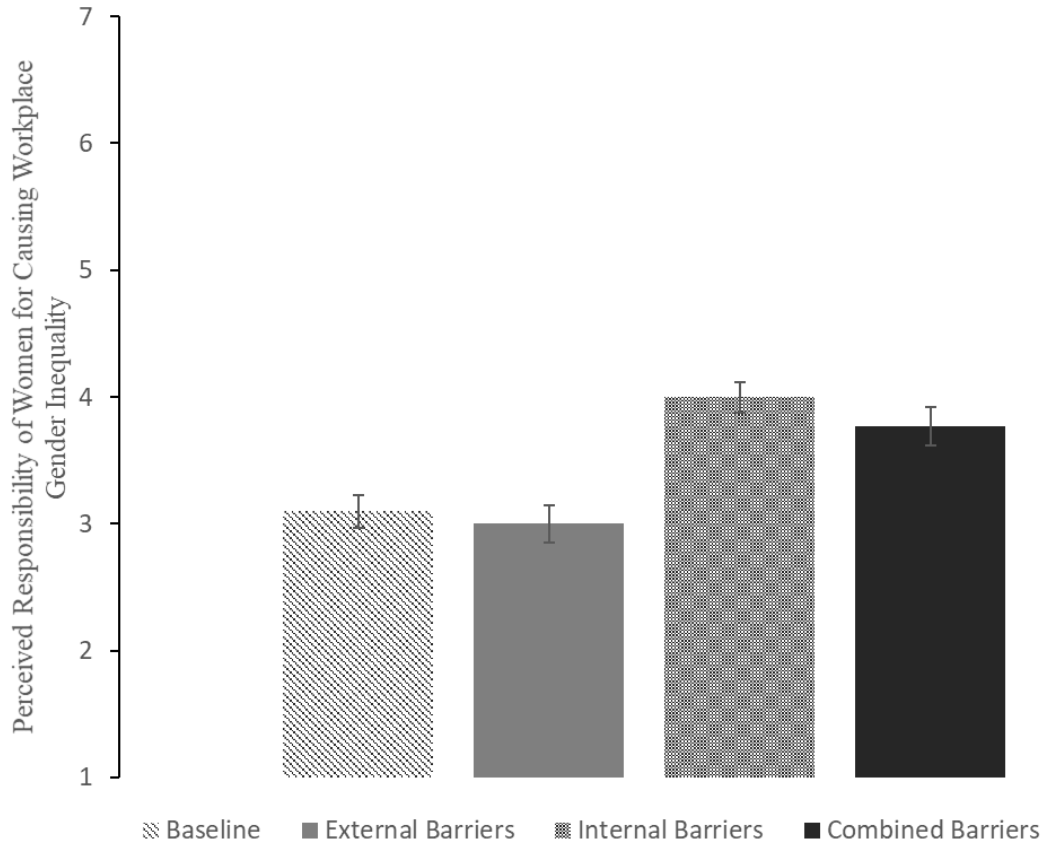

Figure 3. Results from Study 2: Effect of condition on perceived responsibility of women for causing workplace gender inequality (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

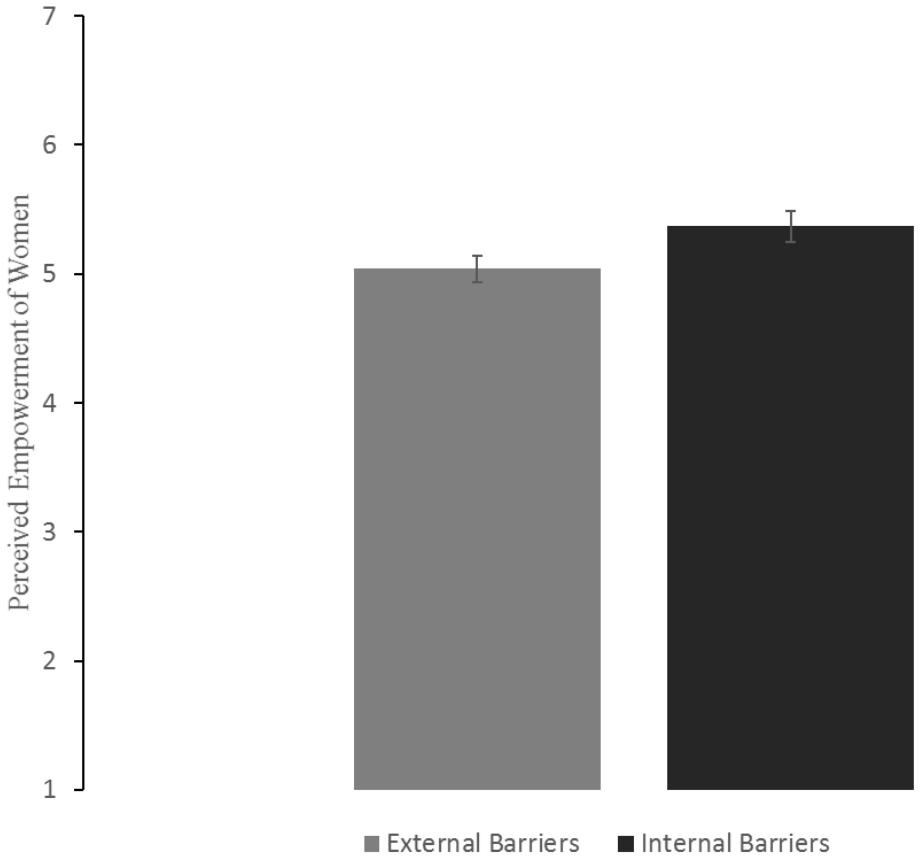

Figure 4. Results from Study 3: Effect of condition on perceived empowerment of women (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

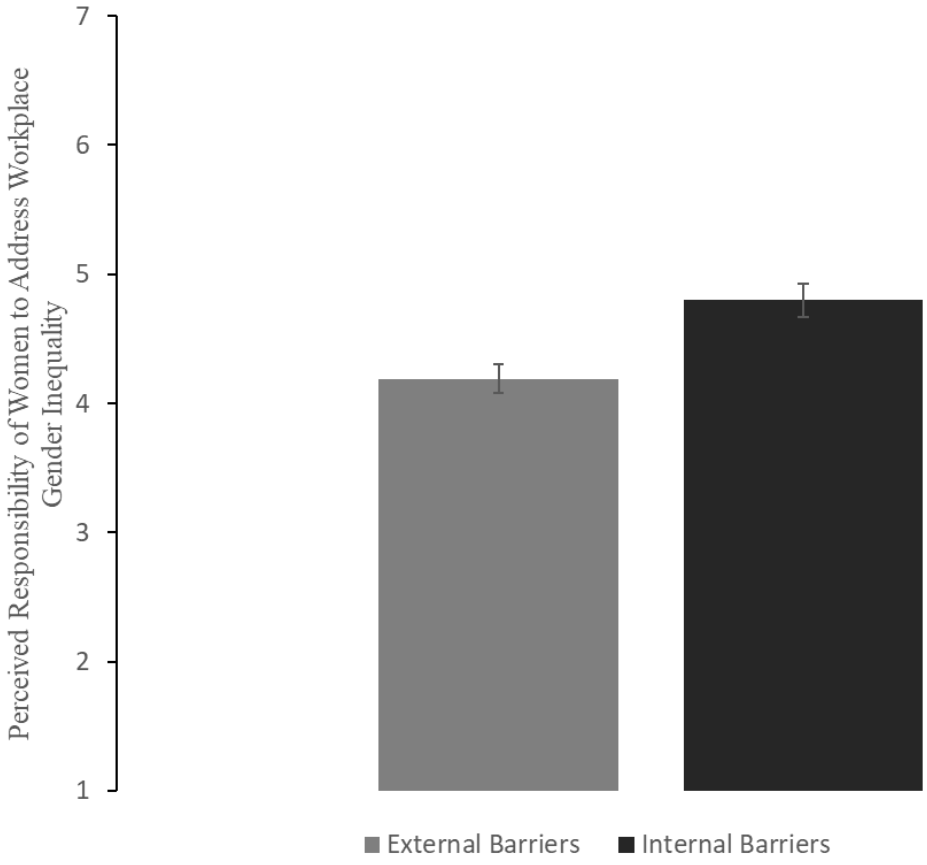

Figure 5. Results from Study 3: Effect of condition on perceived responsibility of women to address workplace gender inequality (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

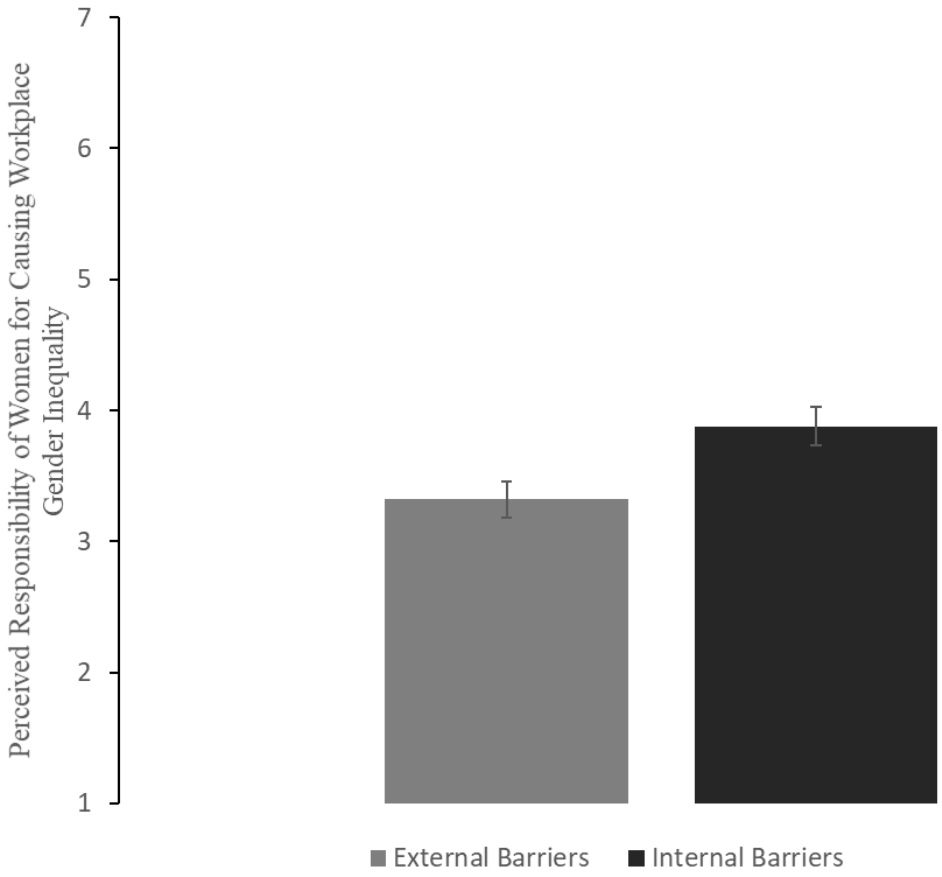

Figure 6. Results from Study 3: Effect of condition on perceived responsibility of women for causing workplace gender inequality (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

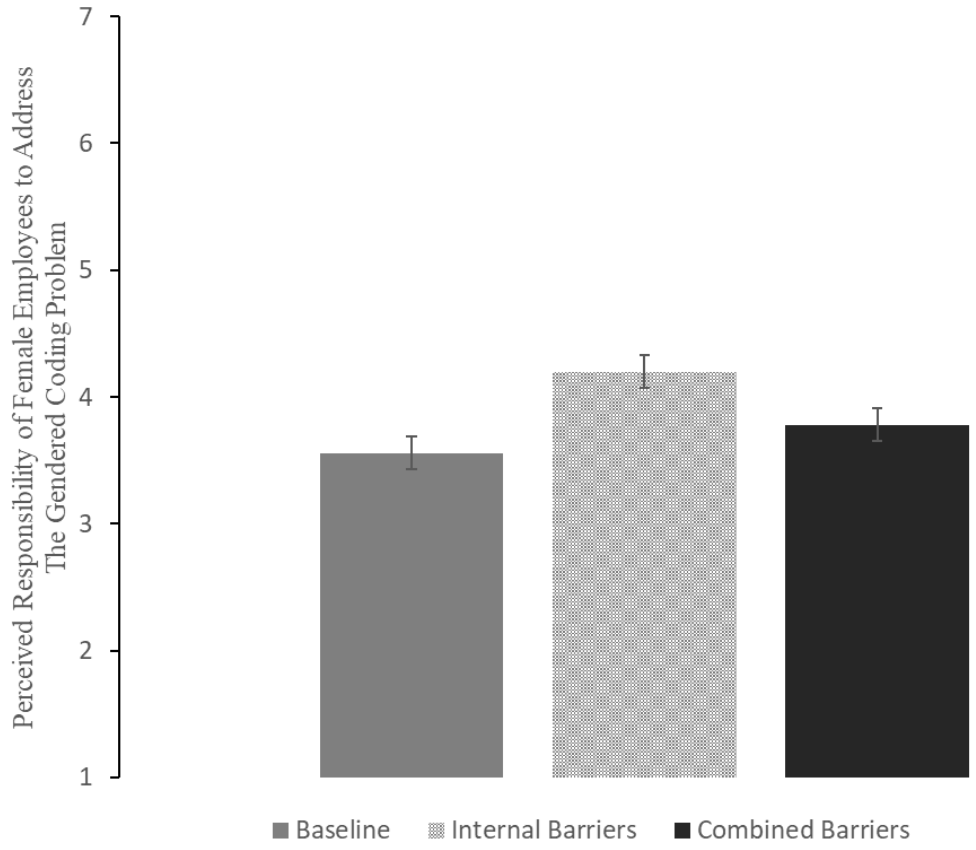

Figure 7. Results from Study 4: Effect of condition on perceived responsibility of female employees to address the gendered coding problem (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

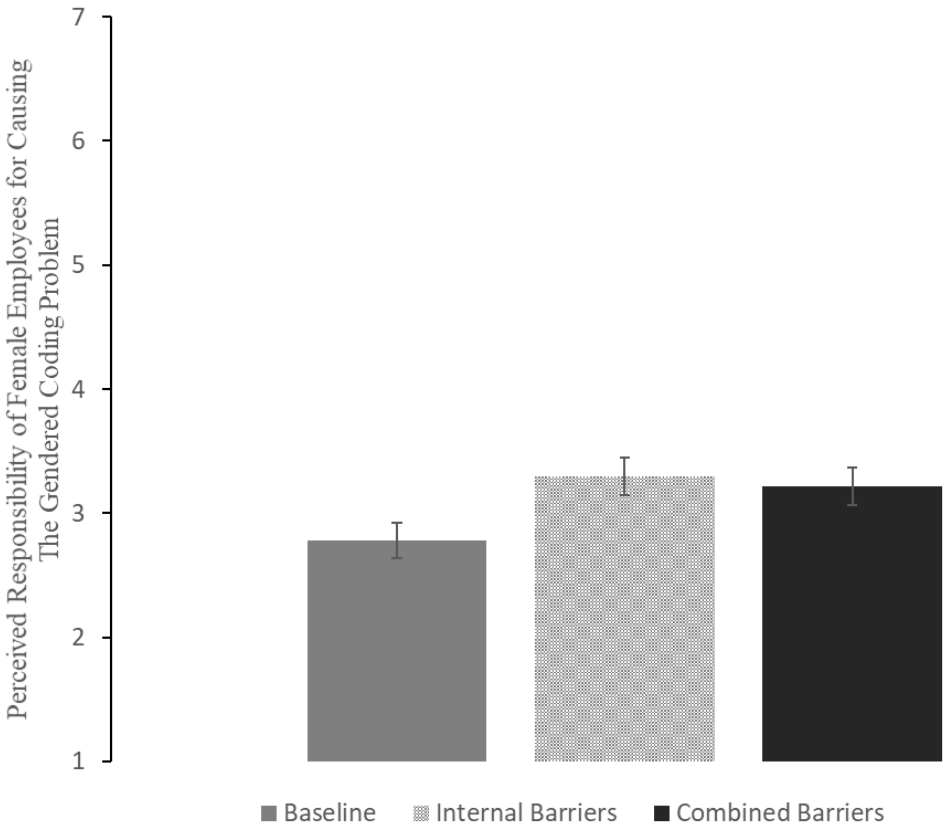

Figure 8. Results from Study 4: Effect of condition on perceived responsibility of female employees for causing the gendered coding problem (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

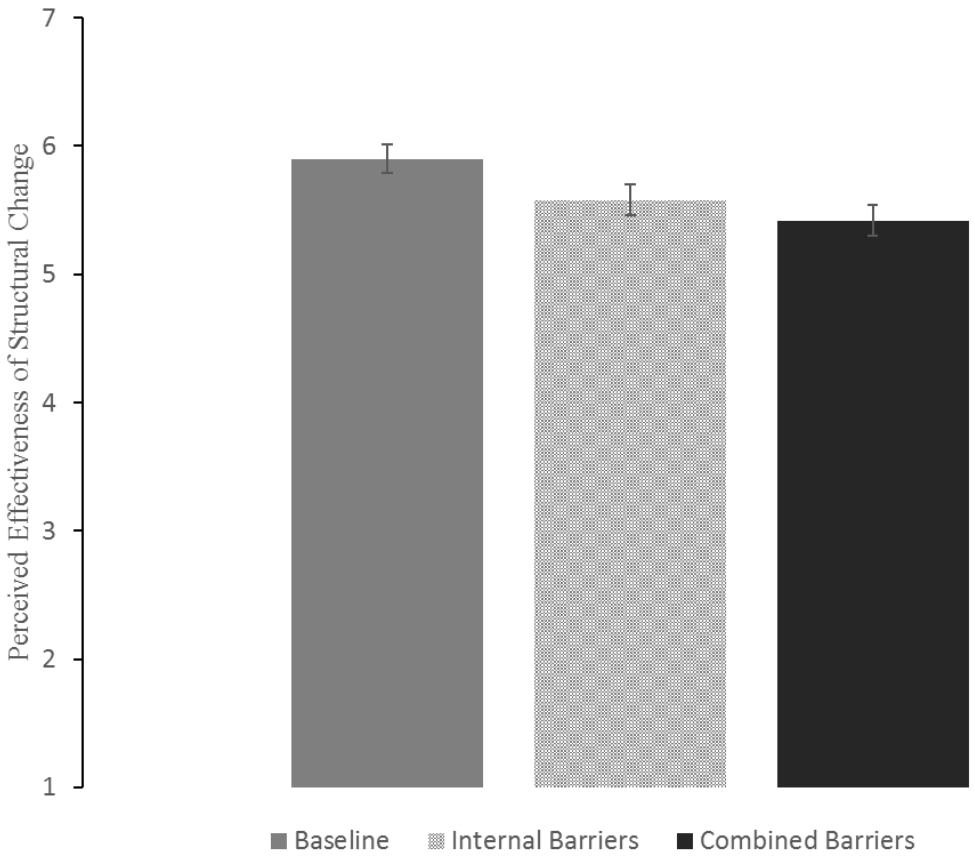

Figure 9. Results from Study 4: Effect of condition on perceived effectiveness of structural change (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

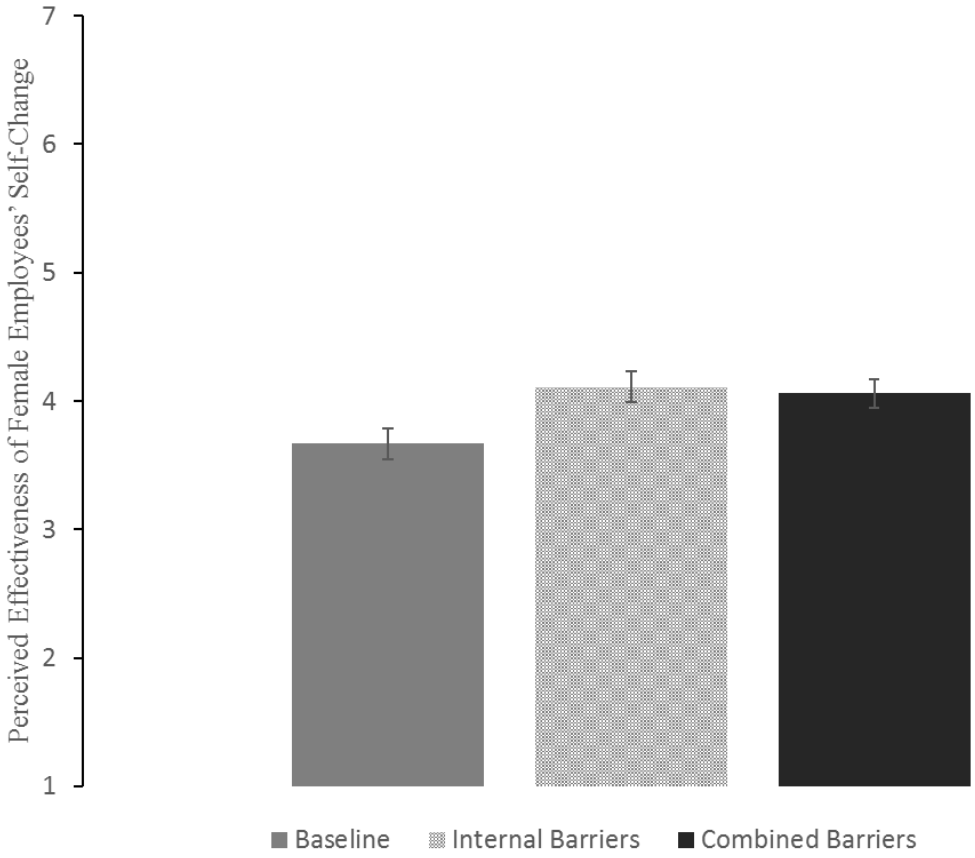

Figure 10. Results from Study 4: Effect of condition on perceived effectiveness of female employees' self-change (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

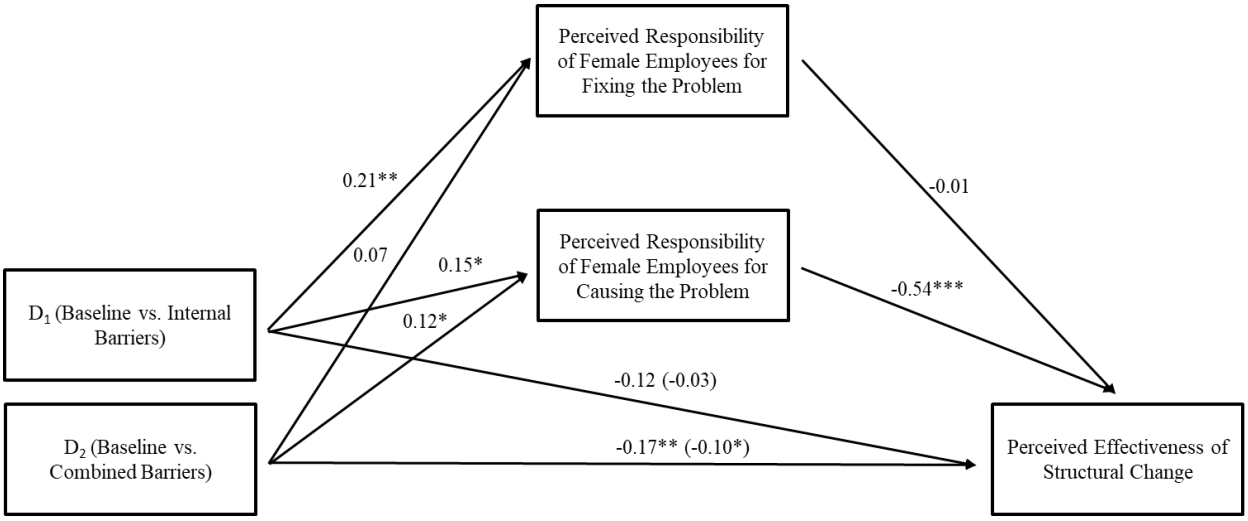

Figure 11. Results from Study 4: Effect of condition on perceived effectiveness of structural change, mediated by perceived responsibility of female employees for solving the gendered coding problem and perceived responsibility of female employees for causing the problem. Standardized regression coefficients are shown (*$p < .05$, **$p < .01$, ***$p < .001$). The value inside parentheses indicates the coefficient when mediators were included in the model.

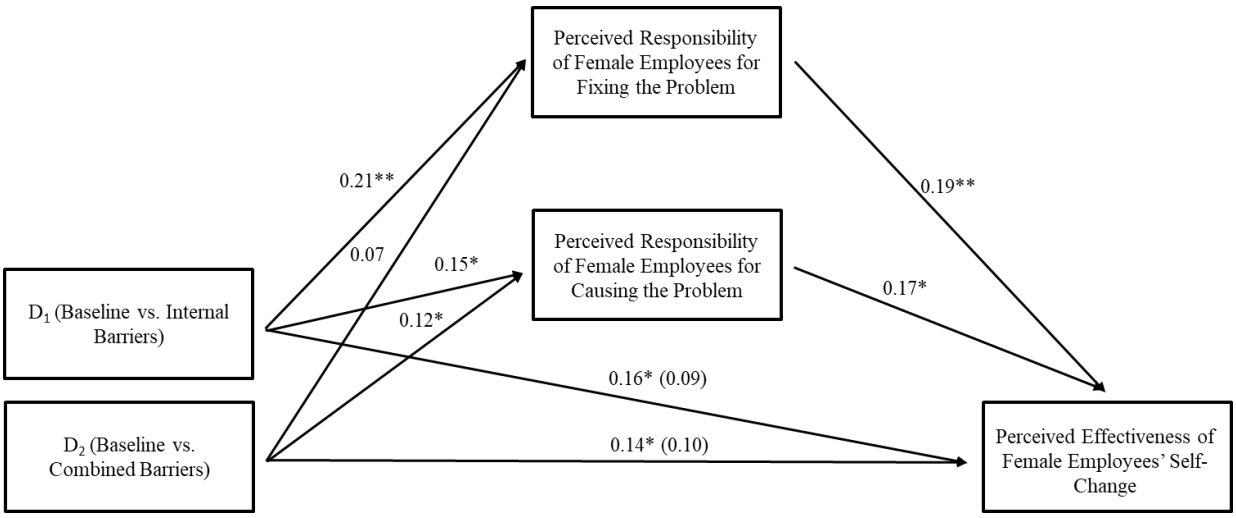

Figure 12. Results from Study 4: Effect of condition on perceived effectiveness of female employees' self-change, mediated by perceived responsibility of female employees for solving the gendered coding problem and perceived responsibility of female employees for causing the problem. Standardized regression coefficients are shown (*$p < .05$, **$p < .01$). The value inside parentheses indicates the coefficient when mediators were included in the model.

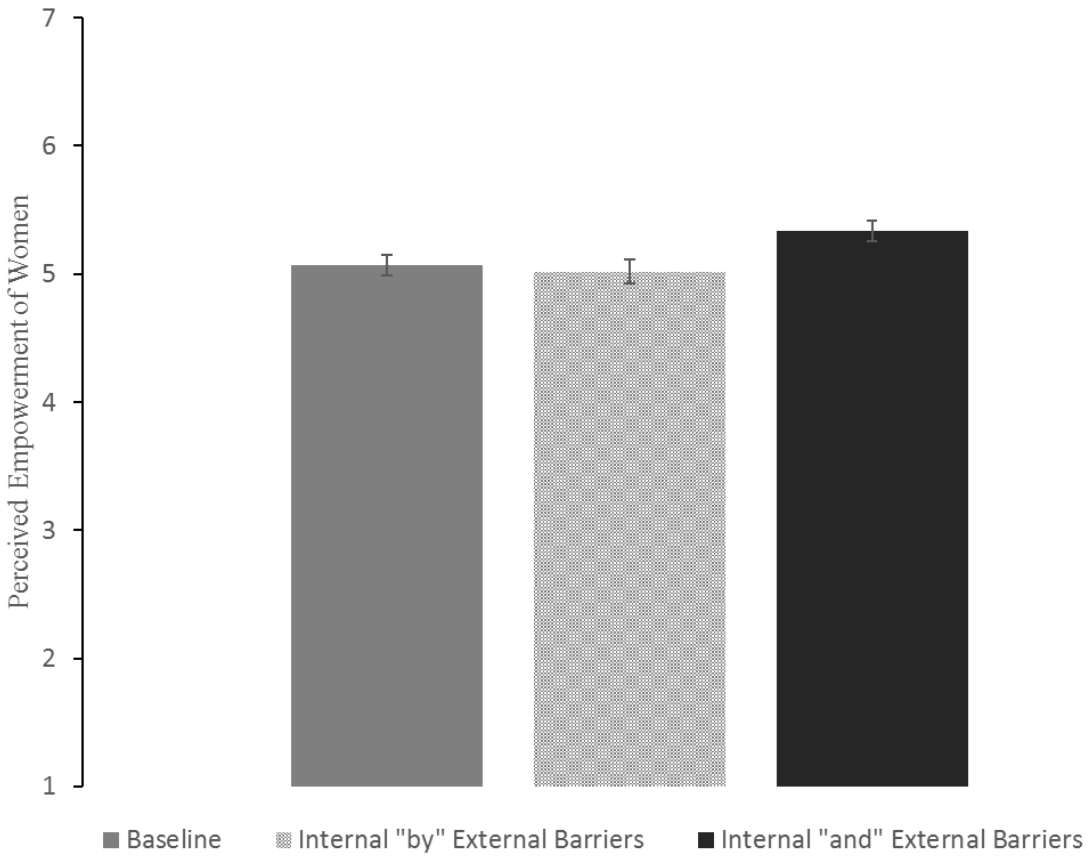

Figure 13. Results from Study 5b: Effect of condition on perceived empowerment of women (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

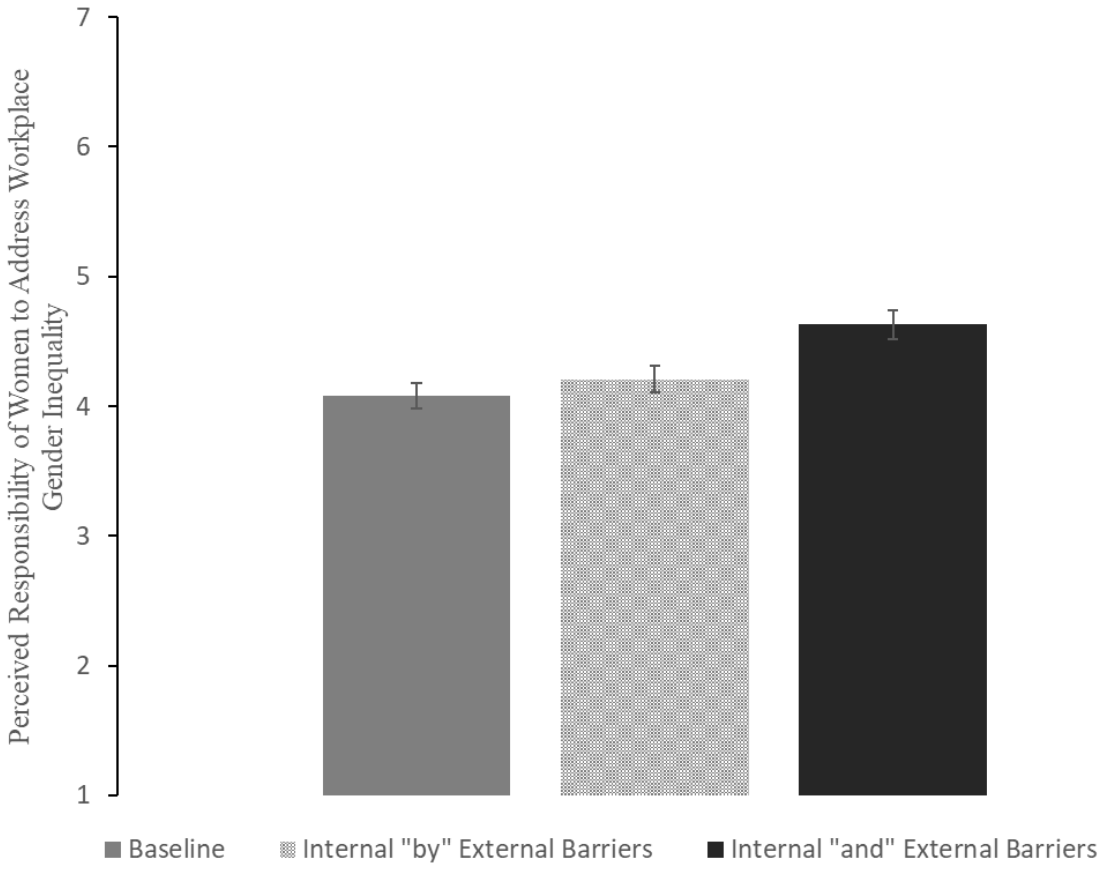

Figure 14. Results from Study 5b: Effect of condition on perceived responsibility of women to address workplace gender inequality (1 – 7 Likert Scale). Error bars indicate ± 1 *SEM*.

Integral Supplementary Materials

In this section, we report additional analyses that may be of interest to readers. We present: (1) a meta-analysis of the key results across studies, (2) mediational analyses using perceived empowerment of women as a mediator of the condition effects on perceived responsibility of women for creating and solving gender inequality in the workplace, (3) analyses looking at gender and political orientation, and (4) all analyses mentioned in footnotes throughout the text of the manuscript.

1. Meta-Analysis

A comparison between the control group (baseline or external barriers) and treatment group (conditions containing internal barriers) did not have a significant effect on perceived responsibility of women for causing workplace gender inequality in Study 5b. We thus performed a meta-analysis (McShane & Böckenholt, 2017) of the six experimental studies (Studies 2, 3, 4, 5a, 5b, and the direct replication of Study 4) to estimate the overall size of the manipulation effect on the main variables: Perceived empowerment of women to fix workplace gender inequality, perceived responsibility of women to address said inequality, and perceived responsibility of women for causing the problem. For the control group, we selected the baseline condition from Studies 2, 4, 5a, and 5b (because Study 3 did not have the baseline condition, a comparable external barriers condition served as the control group). For the treatment group, we selected the internal barriers condition from Studies 2, 3, 4, and 5a (because Study 5b did not have the internal barriers condition, a comparable internal *and* external barriers condition served as the treatment group).

Results of the meta-analyses revealed reliable effects of the treatment vs. control manipulation on perceived empowerment of women, $b = 0.27$, $SE = 0.05$, 95% CI = [0.163,

0.394], attributions of women's responsibility to address workplace gender inequality, $b = 0.57$, $SE = 0.07$, 95% CI = [0.434, 0.713], and attributions of women's responsibility for causing the problem, $b = 0.50$, $SE = 0.11$, 95% CI = [0.279, 0.723]. Together, the results support our hypothesis that, compared to the control condition, women's empowerment messages increase perceptions that women are empowered to tackle workplace gender inequality, and that women have responsibility both for creating and fixing the problem.

2. Perceived Empowerment of Women as Mediator

For readers interested in the women's empowerment measure and how it related to the primary dependent measures, we report here the mediational analyses in full from all of our experimental studies (Studies 2, 3, 4, 5a, and 5b). Given our theorized process, this measure can be seen as a manipulation check for the experimental condition's effectiveness, and can be used to determine if the condition elicits its effect in the theorized manner. That being said, these measures were administered in the same session, and as a result there are concerns with interpreting mediational analyses of this sort. Thus, interested readers should interpret these results with caution.

In sum, perceived empowerment of women acted as a mediator of the condition's effect on perceived responsibility of women for causing and fixing workplace gender inequality in all studies except Study 4 (there was no empowerment effect, and thus, no possible mediation) and Study 5b (empowerment acted as a mediator only for perceived responsibility to address the problem).

Study 2. Using regression for testing a mediation with a multi-categorical independent variable, we explored whether the manipulation of the messages, via perceived empowerment of women, predicted perceived responsibility of women to address workplace gender inequality or

perceived responsibility of women for causing the problem. We used the indicator coding approach (PROCESS Model 4; Hayes & Preacher, 2014) and created two dummy variables (one for each condition: dummy code = 1 if a case is in the group and dummy code = 0 otherwise), using the baseline condition as the reference group. We then estimated the relative indirect effects of each condition (external barriers, internal barriers, and combined barriers) compared to the baseline condition, using 95% bias-corrected bootstrap confidence intervals (with 10,000 bootstrap samples).

The relative indirect effect of the external barriers (vs. baseline) condition on perceived responsibility of women to address workplace gender inequality via perceived empowerment of women was not significant, $b = 0.01$, $SE = 0.10$, 95% CI = [-0.187, 0.201]. We found a significant relative indirect effect of the internal barriers (vs. baseline) condition via perceived empowerment of women, $b = 0.31$, $SE = 0.09$, 95% CI = [0.133, 0.505]. We also found a significant relative indirect effect of the combined barriers (vs. baseline) condition via perceived empowerment of women, $b = 0.24$, $SE = 0.09$, 95% CI = [0.052, 0.445]. Next, we conducted the same mediation analysis, this time using the external barriers condition as the reference group. We found a significant relative indirect effect of the internal barriers (vs. external barriers) condition via perceived empowerment of women, $b = 0.30$, $SE = 0.10$, 95% CI = [0.112, 0.503]. We also found a significant relative indirect effect of the combined barriers (vs. external barriers) condition via perceived empowerment of women, $b = 0.23$, $SE = 0.10$, 95% CI = [0.035, 0.447].

Next, we conducted the same analysis using perceived responsibility of women for causing workplace gender inequality as the dependent variable. The relative indirect effect of the external barriers (vs. baseline) condition via perceived empowerment of women was not significant, $b = 0.0048$, $SE = 0.04$, 95% CI = [-0.091, 0.095]. We found a significant relative

indirect effect of the internal barriers (vs. baseline) condition via perceived empowerment of women, $b = 0.14$, $SE = 0.05$, 95% CI = [0.057, 0.268]. We also found a significant relative indirect effect of the combined barriers (vs. baseline) condition via perceived empowerment of women, $b = 0.11$, $SE = 0.05$, 95% CI = [0.028, 0.228]. Next, we conducted the same mediation analysis, this time using the external barriers condition as the reference group. We found a significant relative indirect effect of the internal barriers (vs. external barriers) condition via perceived empowerment of women, $b = 0.13$, $SE = 0.05$, 95% CI = [0.050, 0.272]. We also found a significant relative indirect effect of the combined barriers (vs. external barriers) condition via perceived empowerment of women, $b = 0.10$, $SE = 0.05$, 95% CI = [0.021, 0.233].

Study 3. We explored whether the manipulation of the messages, via perceived empowerment of women, predicted perceived responsibility of women to address workplace gender inequality or perceived responsibility of women for causing the problem. Using Hayes's (2013) PROCESS macro (Model 4), with 10,000 biased bootstrap samples, we conducted the following mediation analysis: Condition (external barriers = 0, internal barriers = 1) was entered as the independent variable, perceived empowerment of women as the mediator, and perceived responsibility of women for fixing workplace gender inequality as the dependent variable. This mediation analysis revealed a significant indirect effect of the internal barriers (vs. external barriers) condition via perceived empowerment of women, $b = 0.23$, $SE = 0.11$, 95% CI = [0.017, 0.466]. Next, we conducted the same mediation analysis using perceived responsibility of women for causing workplace gender inequality as the dependent variable. This analysis revealed a significant indirect effect of the internal barriers (vs. external barriers) condition via perceived empowerment of women, $b = 0.12$, $SE = 0.07$, 95% CI = [0.013, 0.299].

Study 4. There was no significant main effect on perceived empowerment of women in this study. Therefore, all relative indirect effects of the manipulation on perceived responsibility of women for fixing the gendered coding problem or perceived responsibility of women for causing the problem (via perceived empowerment of women) were not significant.

Study 5a. Using regression for testing a mediation with a multi-categorical independent variable, we explored whether the manipulation of the messages, via perceived empowerment of women, predicted perceived responsibility of women for fixing workplace gender inequality or perceived responsibility of women for causing the problem. We used the indicator coding approach (PROCESS Model 4; Hayes & Preacher, 2014) and created two dummy variables (one for each condition: dummy code = 1 if a case is in the group and dummy code = 0 otherwise), using the baseline condition as the reference group. We then estimated the relative indirect effects of each condition (internal barriers and internal *by* external barriers) compared to the baseline condition, using 95% bias-corrected bootstrap confidence intervals (with 10,000 bootstrap samples).

We found a significant relative indirect effect of the internal barriers (vs. baseline) condition on perceived responsibility of women for fixing workplace gender inequality via perceived empowerment of women, $b = 0.18$, $SE = 0.08$, 95% CI = [0.007, 0.358]. The relative indirect effect of the internal *by* external barriers (vs. baseline) condition via perceived empowerment of women was not significant, $b = 0.09$, $SE = 0.08$, 95% CI = [-0.069, 0.269]. Next, we conducted the same mediation analysis, this time using the internal barriers condition as the reference group. The relative indirect effect of the internal *by* external barriers (vs. internal barriers) condition via perceived empowerment of women was not significant, $b = -0.08$, $SE = 0.08$, 95% CI = [-0.254, 0.091].

Next, we conducted the same analysis using perceived responsibility of women for causing workplace gender inequality as the dependent variable. We found a significant relative indirect effect of the internal barriers (vs. baseline) condition via perceived empowerment of women, $b = 0.05$, $SE = 0.03$, 95% CI = [0.004, 0.166]. The relative indirect effect of the internal *by* external barriers (vs. baseline) condition via perceived empowerment of women was not significant, $b = 0.02$, $SE = 0.03$, 95% CI = [-0.012, 0.118]. Next, we conducted the same mediation analysis, this time using the internal barriers condition as the reference group. The relative indirect effect of the internal *by* external barriers (vs. internal barriers) condition via perceived empowerment of women was not significant, $b = -0.02$, $SE = 0.03$, 95% CI = [-0.114, 0.017].

Study 5b. Using regression for testing a mediation with a multi-categorical independent variable, we explored whether the manipulation of the messages, via perceived empowerment of women, predicted perceived responsibility of women for fixing workplace gender inequality or perceived responsibility of women for causing the problem. We used the indicator coding approach (PROCESS Model 4; Hayes & Preacher, 2014) and created two dummy variables (one for each condition: dummy code = 1 if a case is in the group and dummy code = 0 otherwise), using the baseline condition as the reference group. We then estimated the relative indirect effects of each condition (internal *and* barriers and internal *by* external barriers) compared to the baseline condition, using 95% bias-corrected bootstrap confidence intervals (with 10,000 bootstrap samples).

The relative indirect effect of the internal *by* external barriers (vs. baseline) condition on perceived responsibility of women for fixing workplace gender inequality via perceived empowerment of women was not significant, $b = -0.03$, $SE = 0.07$, 95% CI = [-0.177, 0.112]. We

found a significant relative indirect effect of the internal *and* external barriers (vs. baseline) condition via perceived empowerment of women, $b = 0.15$, $SE = 0.07$, 95% CI = [0.025, 0.313]. Next, we conducted the same mediation analysis, this time using the internal *by* external barriers condition as the reference group. We found a significant relative indirect effect of the internal *and* external barriers (vs. internal *by* external barriers) condition via perceived empowerment of women, $b = 0.19$, $SE = 0.07$, 95% CI = [0.049, 0.352].

Next, we conducted the same analysis using perceived responsibility of women for causing workplace gender inequality as the dependent variable. The relative indirect effect of the internal *by* external barriers (vs. baseline) condition via perceived empowerment of women was not significant, $b = -0.004$, $SE = 0.01$, 95% CI = [-0.063, 0.013]. The relative indirect effect of the internal *and* external barriers (vs. baseline) condition via perceived empowerment of women was also not significant, $b = 0.02$, $SE = 0.02$, 95% CI = [-0.017, 0.100]. Next, we conducted the same mediation analysis, this time using the internal *by* external barriers condition as the reference group. The relative indirect effect of the internal *and* external barriers (vs. internal *by* external barriers) condition via perceived empowerment of women was not significant, $b = 0.02$, $SE = 0.03$, 95% CI = [-0.022, 0.116].

3. Gender and Political Orientation

For readers interested in the role of participant gender and political orientation, we report here analyses using both variables as predictors of the dependent measures, and as moderators of the condition effects on the dependent measures. None of these effects were hypothesized, and given the number of tests reported, should be interpreted with caution.

In sum, participant gender elicited no consistent effects. Political orientation (higher score indicates greater political conservatism) consistently predicted greater perceived

responsibility of women for causing the problem, and lower perceived responsibility of men for fixing and causing the problem.

Study 2. Participant gender significantly predicted perceived empowerment of women, $F(1, 438) = 7.65$, $p = .006$, partial $\eta^2 = 0.017$, such that female participants saw women as more empowered ($M = 5.30$, $SD = 1.09$) than did male participants ($M = 5.01$, $SD = 1.13$). Gender also significantly predicted attributions of women's responsibility to address workplace gender inequality, $F(1, 438) = 4.25$, $p = .040$, partial $\eta^2 = 0.01$, such that female participants held women more responsible for fixing the problem ($M = 4.58$, $SD = 1.32$) than did male participants ($M = 4.31$, $SD = 1.37$). Gender did not predict attributions of women's responsibility for causing workplace gender inequality, $F(1, 438) = 0.79$, $p > .250$, partial $\eta^2 = 0.002$.

Participant gender did not significantly predict perceived empowerment of men, $F(1, 438) = 2.96$, $p = .086$, partial $\eta^2 = 0.007$, or attributions of men's responsibility to address workplace gender inequality, $F(1, 438) = 1.57$, $p = .210$, partial $\eta^2 = 0.004$. However, it did predict attributions of men's responsibility for causing the problem, $F(1, 438) = 6.19$, $p = .013$, partial $\eta^2 = 0.014$, such that female participants attributed greater causal responsibility to men ($M = 4.96$, $SD = 1.45$) than did male participants ($M = 4.61$, $SD = 1.47$).

In 2 (male vs. female participants) × 4 (baseline vs. external barriers vs. internal barriers vs. combined barriers) ANOVAs, the only significant interaction emerged for perceived empowerment of women, $F(3, 432) = 2.63$, $p = .049$, partial $\eta^2 = 0.018$. The pattern of means suggest that male participants were affected more by the combined barriers condition (relative to baseline and external barriers) than were female participants, perceiving women to be empowered at the highest level after reading the combined barriers messages.

Political orientation (higher score indicates greater political conservatism) was significantly and positively correlated with perceived responsibility of women for causing workplace gender inequality, $r(440) = .19$, $p < .001$, but was not significantly correlated with perceived empowerment of women, $r(440) = -.02$, $p > .250$, and perceived responsibility of women for fixing the problem, $r(440) = .09$, $p = .050$. Political orientation was significantly and negatively correlated with perceived empowerment of men, $r(440) = -.22$, $p < .001$, perceived responsibility of men to address workplace gender inequality, $r(440) = -.16$, $p < .001$, and perceived responsibility of men for causing the problem, $r(440) = -.32$, $p < .001$.

Political orientation did not produce significant Political Orientation × Condition interactions on our main variables except on perceived empowerment of men (baseline vs. combined barriers), $b = -0.26$, $SE = .09$, $t(432) = -2.88$, $p = .004$, and (external barriers vs. combined barriers), $b = -0.22$, $SE = .09$, $t(432) = -2.36$, $p = .019$. Given the unpredicted nature of the interaction, we hesitate to interpret the effect, but the pattern of the results suggest that political conservatism predicted lower perceptions that men are empowered to tackle workplace gender inequality in the combined barriers condition (but not in baseline or the external barriers condition).

Study 3. Participant gender significantly predicted perceived empowerment of women, $F(1, 190) = 15.66$, $p < .001$, partial $\eta^2 = 0.076$, such that female participants saw women as more empowered ($M = 5.48$, $SD = 1.01$) than did male participants ($M = 4.89$, $SD = 1.04$). Gender also significantly predicted perceived responsibility of women to address workplace gender inequality, $F(1, 190) = 10.25$, $p = .002$, partial $\eta^2 = 0.051$, such that female participants held women more responsible for fixing the problem ($M = 4.75$, $SD = 1.25$) than did male participants

(*M* = 4.18, *SD* = 1.17). Participant gender did not significantly predict perceived responsibility of women for causing workplace gender inequality, $F(1, 190) = 0.71$, $p > .250$, partial $\eta^2 = 0.004$.

Participant gender did not significantly predict perceived empowerment of men, $F(1, 190) = 0.78$, $p > .250$, partial $\eta^2 = 0.004$, perceived responsibility of men to address workplace gender inequality, $F(1, 190) = 0.07$, $p > .250$, partial $\eta^2 = 0.003$, or perceived responsibility of men for causing the problem, $F(1, 190) = 0.65$, $p > .250$, partial $\eta^2 = 0.003$. 2 (male vs. female participants) × 2 (external barriers vs. internal barriers) ANOVAs on our main variables of interest revealed no significant interactions (all $p > .242$).

Political orientation (higher score indicates greater political conservatism) was significantly and positively correlated with perceived responsibility of women for causing workplace gender inequality, $r(194) = .22$, $p < .01$, but was not significantly correlated with perceived empowerment of women, $r(194) = .03$, $p > .250$, and perceived responsibility of women to address workplace gender inequality, $r(194) = .01$, $p > .250$. Political orientation was significantly and negatively correlated with perceived empowerment of men, $r(194) = -.22$, $p < .01$, perceived responsibility of men to address workplace gender inequality, $r(194) = -.31$, $p < .001$, and perceived responsibility of men for causing the problem, $r(194) = -.29$, $p < .001$.

Political orientation did not produce significant Political Orientation × Condition interactions on our main variables except on perceived empowerment of women, $b = 0.19$, $SE = .09$, $t(190) = 2.14$, $p = .034$, and attributions of women's responsibility to address workplace gender inequality, $b = 0.30$, $SE = .10$, $t(190) = 2.95$, $p = .004$. Given the unpredicted nature of the interaction, we hesitate to interpret the effect, but the pattern of the results suggest that people high on political conservatism (those who scored 1 standard deviation above the mean: $M = 5.09$) were more likely to perceive that women are empowered in the internal barriers condition (vs.

the external barriers condition). However, people low on political conservatism (those who scored 1 standard deviation below the mean: $M = 1.62$) did not differ in their perceptions of women's empowerment. The same pattern emerged for attributions of women's responsibility to address workplace gender inequality.

Study 4. Participant gender did not significantly predict perceived empowerment of female engineers, $F(1, 327) = 1.35$, $p = .246$, partial $\eta^2 = 0.004$. We also observed no significant gender difference with perceived responsibility of female employees to address the gendered coding problem, $F(1, 327) = 1.87$, $p = .172$, partial $\eta^2 = 0.006$. However, gender significantly predicted attributions of female engineers' responsibility for causing the problem, $F(1, 327) = 7.75$, $p = .006$, partial $\eta^2 = 0.023$, such that male participants attributed a greater causal responsibility to female engineers for the problem ($M = 3.33$, $SD = 1.65$) than did female participants ($M = 2.85$, $SD = 1.45$).

Participant gender did not significantly predict perceived empowerment of male engineers, $F(1, 327) = 0.84$, $p > .250$, partial $\eta^2 = 0.003$. We also observed no significant gender difference with perceived responsibility of male engineers to address the gendered coding problem, $F(1, 327) = 0.62$, $p > .250$, partial $\eta^2 = 0.002$. However, participant gender significantly predicted attributions of male engineers' responsibility for causing the problem, $F(1, 327) = 7.03$, $p = .008$, partial $\eta^2 = 0.021$, such that female participants attributed a greater causal responsibility to male engineers for the problem ($M = 4.00$, $SD = 1.60$) than did male participants ($M = 3.53$, $SD = 1.59$).

Participant gender significantly predicted perceived effectiveness of structural change, $F(1, 327) = 21.72$, $p < .001$, partial $\eta^2 = 0.062$, such that female participants perceived structural change is more effective as a solution for gender bias ($M = 5.98$, $SD = 1.07$) than did male

participants (M = 5.34, SD = 1.35). However, there was no significant gender difference with perceived effectiveness of female employees' self-change, $F(1, 327) = 1.94$, $p = .164$, partial $\eta^2 = 0.006$.

We conducted 2 (male vs. female participants) × 3 (baseline vs. internal barriers vs. combined barriers) ANOVAs on our main variables of interest and found no significant interactions (all $p > .066$) except two on perceived empowerment of female engineers, $F(2, 323) = 3.07$, $p = .048$, partial $\eta^2 = 0.019$, and perceived empowerment of male engineers, $F(2, 323) = 3.03$, $p = .049$, partial $\eta^2 = 0.018$. Given the unpredicted nature of the interactions, we hesitate to interpret the effect, but the pattern of means suggest that (for manipulation check on perceived empowerment of female engineers) male participants were affected more by the combined barriers condition (relative to baseline) than were female participants, perceiving female engineers to be empowered at the lowest level after reading the combined barriers messages. For manipulation check on perceived empowerment of male engineers, female participants were affected more by the internal barriers condition (relative to baseline) than were male participants, perceiving male engineers to be empowered at the highest level after reading the internal barriers messages.

Political orientation (higher score indicates greater political conservatism) was significantly and positively correlated with perceived responsibility of female engineers to address the gendered coding problem, $r(330) = .24$, $p < .001$, and perceived responsibility of female engineers for causing the problem, $r(330) = .30$, $p < .001$, but was not significantly correlated with perceived empowerment of female engineers, $r(330) = .04$, $p > .250$. Political orientation was significantly and negatively correlated with perceived responsibility of male engineers to address the gendered coding problem, $r(330) = -.13$, $p < .05$, and perceived

responsibility of male engineers for causing the problem, $r(330) = -.24$, $p < .001$, but was not significantly correlated with perceived empowerment of male engineers, $r(330) = -.09$, $p = .101$. Political orientation was significantly and negatively correlated with perceived effectiveness of structural change, $r(330) = -.21$, $p < .001$, but was not significantly correlated with perceived effectiveness of female engineers' self-change, $r(330) = .10$, $p = .062$.

Political orientation did not produce significant Political Orientation × Condition interactions on our main variables except on perceived responsibility of male engineers for causing the gendered coding problem (baseline vs. combined barriers), $b = 0.31$, $SE = .13$, $t(324) = 2.42$, $p = .016$, and (internal barriers vs. combined barriers), $b = 0.30$, $SE = .13$, $t(324) = 2.23$, $p = .026$. Given the unpredicted nature of the interaction, we hesitate to interpret the effect, but the pattern of the results suggest that political conservatism predicted lower perceptions of male engineers' responsibility for causing the gendered coding problem in the baseline condition or the internal barriers condition (but not in the combined barriers condition).

Study 5a. Participant gender significantly predicted perceived empowerment of women, $F(1, 336) = 4.12$, $p = .043$, partial $\eta^2 = 0.012$, such that female participants saw women as more empowered ($M = 5.09$, $SD = 1.06$) than did male participants ($M = 4.85$, $SD = 1.05$). We observed no significant gender difference with perceived responsibility of women to address workplace gender inequality, $F(1, 336) = 1.11$, $p = .293$, partial $\eta^2 = 0.003$. There was also no significant gender difference with perceived responsibility of women for causing the problem, $F(1, 336) = 3.24$, $p = .073$, partial $\eta^2 = 0.01$.

Participant gender significantly predicted perceived empowerment of men, $F(1, 336) = 5.16$, $p = .024$, partial $\eta^2 = 0.015$, such that female participants saw men as more empowered ($M = 5.08$, $SD = 1.06$) than did male participants ($M = 4.80$, $SD = 1.14$). We observed no significant

gender difference with perceived responsibility of men to address workplace gender inequality, $F(1, 336) = 1.06$, $p > .250$, partial $\eta^2 = 0.003$. There was also no significant gender difference with perceived responsibility of men for causing the problem, $F(1, 336) = 3.45$, $p = .064$, partial $\eta^2 = 0.010$. We conducted 2 (male vs. female participants) × 3 (baseline vs. internal barriers vs. internal barriers *by* external barriers) ANOVAs on our main variables of interest and found no significant interactions (all $p > .070$).

Political orientation was significantly and positively correlated with perceived responsibility of women to address workplace gender inequality, $r(338) = .14$, $p < .01$, and perceived responsibility of women for causing the problem, $r(338) = .26$, $p < .001$, but was not significantly correlated with perceived empowerment of women, $r(338) = .01$, $p > .250$. Political orientation was significantly and negatively correlated with perceived empowerment of men, $r(338) = -.20$, $p < .001$, perceived responsibility of men to address workplace gender inequality, $r(338) = -.33$, $p < .001$, and perceived responsibility of men for causing the problem, $r(338) = -.43$, $p < .001$.

Political orientation did not produce significant Political Orientation × Condition interactions on our main variables except on perceived responsibility of women for causing workplace gender inequality (baseline vs. internal barriers), $b = -0.27$, $SE = .10$, $t(332) = -2.49$, $p = .013$, and (internal barriers vs. internal *by* external barriers), $b = 0.26$, $SE = .11$, $t(332) = 2.40$, $p = .017$. Given the unpredicted nature of the interaction, we hesitate to interpret the effect, but the pattern of the results suggest that people low on political conservatism (those who scored 1 standard deviation below the mean: $M = 1.71$) were less likely to perceive that women have responsibility for causing the problem in the internal barriers (vs. baseline or internal *by* external barriers) condition. However, people high on political conservatism (those who scored 1 standard

deviation above the mean: $M = 5.12$) did not differ in their perceptions of women's responsibility for causing the problem.

Study 5b. Participant gender significantly predicted perceived empowerment of women, $F(1, 341) = 3.90$, $p = .049$, partial $\eta^2 = 0.011$, such that female participants saw women as more empowered ($M = 5.22$, $SD = 0.91$) than did male participants ($M = 5.02$, $SD = 0.98$). We observed no significant gender difference with perceived responsibility of women to address workplace gender inequality, $F(1, 341) = 0.008$, $p > .250$, partial $\eta^2 = 0.00002$. There was also no significant gender difference with perceived responsibility of women for causing the problem, $F(1, 341) = 3.26$, $p = .072$, partial $\eta^2 = 0.009$.

Participant gender significantly predicted perceived empowerment of men, $F(1, 341) = 5.10$, $p = .025$, partial $\eta^2 = 0.015$, such that female participants saw men as more empowered ($M = 5.00$, $SD = 1.01$) than did male participants ($M = 4.74$, $SD = 1.05$). We observed no significant gender difference with perceived responsibility of men to address workplace gender inequality, $F(1, 341) = 0.008$, $p > .250$, partial $\eta^2 = 0.00002$. There was also no significant gender difference with perceived responsibility of men for causing the problem, $F(1, 341) = 3.40$, $p = .066$, partial $\eta^2 = 0.01$. We conducted 2 (male vs. female participants) × 3 (baseline vs. internal barriers *by* external barriers vs. internal *and* external barriers) ANOVAs on our main variables of interest and found no significant interactions (all $p > .250$).

Political orientation was significantly and positively correlated with perceived responsibility of women for causing workplace gender inequality, $r(344) = .29$, $p < .001$, but was not significantly correlated with perceived empowerment of women, $r(344) = .05$, $p > .250$, and perceived responsibility of women to address the problem, $r(344) = .10$, $p = .059$. Political orientation was significantly and negatively correlated with perceived empowerment of men,

$r(344) = -.16$, $p < .01$, perceived responsibility of men to address workplace gender inequality, $r(344) = -.25$, $p < .001$, and perceived responsibility of men for causing the problem, $r(344) = -.33$, $p < .001$.

Political orientation did not produce significant Political Orientation × Condition interactions on our main variables except on perceived empowerment of women (baseline vs. internal *by* external barriers), $b = 0.14$, $SE = .07$, $t(338) = 2.01$, $p = .045$, perceived responsibility of men to address workplace gender inequality (baseline vs. internal *by* external barriers), $b = -0.19$, $SE = .10$, $t(338) = -1.98$, $p = .048$, and perceived responsibility of men for causing the problem (baseline vs. internal *by* external barriers), $b = -0.25$, $SE = .09$, $t(338) = -2.57$, $p = .010$. Given the unpredicted nature of the interaction, we hesitate to interpret the effect, but the pattern of the results suggest that political conservatism predicts greater perceived empowerment of women, lower assignment of responsibility for fixing the problem to men, and lower perceived responsibility of men for causing the problem in the internal *by* external condition (but not in baseline).

4. Additional Analyses Reported in Footnotes in Main Text

 # 3 (Manipulation effects on the male-oriented items in Studies 2, 3, 4, 5a, and 5b).

Study 2. A one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure of perceived empowerment of men to tackle workplace gender inequality ($\alpha = .79$; $M = 4.90$, $SD = 1.12$), $F(3, 436) = 0.79$, $p > .250$, partial $\eta^2 = .005$. Condition also did not significantly affect perceived responsibility of men to fix the problem ($r = .67$, $p < .001$; $M = 4.15$, $SD = 1.46$), $F(3, 436) = 1.35$, $p > .250$, partial $\eta^2 = .009$, or attributions of men's responsibility for causing the problem ($r = .67$, $p < .001$; $M = 4.79$, $SD = 1.47$), $F(3, 436) = 0.06$, $p > .250$, partial $\eta^2 = .0004$.

Study 3. A one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure of perceived empowerment of men to tackle workplace gender inequality ($\alpha = .80$; $M = 4.73$, $SD = 1.19$), $F(1, 192) = 0.35$, $p > .250$, partial $\eta^2 = .002$. Condition also did not significantly affect perceived responsibility of men to fix the problem ($r = .62$, $p < .001$; $M = 4.17$, $SD = 1.41$), $F(1, 192) = 1.63$, $p = .203$, partial $\eta^2 = .008$, or attributions of men's responsibility for causing the problem ($r = .67$, $p < .001$; $M = 4.73$, $SD = 1.51$), $F(1, 192) = 0.24$, $p > .250$, partial $\eta^2 = .001$.

Study 4. A one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure of perceived empowerment of male engineers to tackle the coding problem ($\alpha = .78$; $M = 4.54$, $SD = 1.22$), $F(2, 327) = 0.04$, $p > .250$, partial $\eta^2 = .0002$. Condition also did not significantly affect perceived responsibility of male engineers to fix the problem ($r = .57$, $p < .001$; $M = 3.85$, $SD = 1.51$), $F(2, 327) = 0.16$, $p > .250$, partial $\eta^2 = .001$, or attributions of causal responsibility of male engineers ($r = .70$, $p < .001$; $M = 3.75$, $SD = 1.61$), $F(2, 327) = 0.91$, $p > .250$, partial $\eta^2 = .006$.

Study 5a. A one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure of perceived empowerment of men to tackle workplace gender inequality ($\alpha = .77$; $M = 4.96$, $SD = 1.10$), $F(2, 335) = 2.42$, $p = .090$, partial $\eta^2 = .014$. Condition also did not significantly affect perceived responsibility of men to fix the problem ($r = .70$, $p < .001$; $M = 4.36$, $SD = 1.41$), $F(2, 335) = 0.63$, $p > .250$, partial $\eta^2 = .004$, or attributions of men's responsibility for causing the problem ($r = .61$, $p < .001$; $M = 4.90$, $SD = 1.45$), $F(2, 335) = 0.56$, $p > .250$, partial $\eta^2 = .003$.

Study 5b. A one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure of perceived empowerment of men to tackle workplace gender

inequality (α = .74; *M* = 4.90, *SD* = 1.03), *F*(2, 341) = 0.85, *p* > .250, partial η^2 = .005. Condition also did not significantly affect perceived responsibility of men to fix the problem, or perceived contribution of men to the existing problem (*r* = .61, *p* < .001; *M* = 4.48, *SD* = 1.36), *F*(2, 341) = 2.21, *p* = .111, partial η^2 = .013, or attributions of men's responsibility for causing the problem (*r* = .71, *p* < .001; *M* = 5.08, *SD* = 1.39), *F*(2, 341) = 0.76, *p* > .250, partial η^2 = .004.

 # 14 (A direct replication of Study 4; N = 332, M_{age} = 35.31, SD = 10.76; 56.0% female).

Results

Perceptions of Male Employees. A one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure of perceived empowerment of male engineers to tackle the coding problem, *F*(2, 329) = 0.65, *p* > .250, partial η^2 = .004, perceived responsibility of male engineers to fix the problem, *F*(2, 329) = 0.46, *p* > .250, partial η^2 = .003, or attributions of male engineers' responsibility for causing the problem, *F*(2, 329) = 1.03, *p* > .250, partial η^2 = .006.

Perceived Empowerment of Female Employees. A one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure of perceived empowerment of female engineers to tackle the gendered coding problem, *F*(2, 329) = 1.42, *p* = .242, partial η^2 = .009. Contrast analyses revealed that the internal barriers condition (*M* = 4.74, *SD* = 1.06) did not differ from baseline (*M* = 4.50, *SD* = 1.28), *F*(1, 329) = 2.31, *p* = .129, nor from the combined barriers condition (*M* = 4.72, *SD* = 1.25), *F*(1, 329) = 0.02, *p* > .250. The baseline condition and the combined barriers condition also did not differ on perceived empowerment of female engineers, *F*(1, 329) = 1.85, *p* = .174.

Perceived Responsibility of Female Employees to Address the Coding Problem. A one-way Analysis of Variance (ANOVA) indicated that condition significantly affected attributions of female engineers' responsibility to address the gendered coding problem, $F(2, 329) = 3.67$, $p = .027$, partial $\eta^2 = 0.022$. Contrast analyses revealed that participants in the internal barriers condition held female engineers more responsible for fixing the problem ($M = 4.11$, $SD = 1.30$) than did participants in the baseline condition ($M = 3.67$, $SD = 1.41$), $F(1, 329) = 5.68$, $p = .017$. Similarly, participants in the combined barriers condition held female engineers more responsible for fixing the problem ($M = 4.09$, $SD = 1.45$) than did participants in the baseline condition, $F(1, 329) = 5.08$, $p = .024$. The internal barriers condition and the combined barriers condition did not differ on assignment of responsibility to female engineers, $F(1, 329) = 0.01$, $p > .250$.

Perceived Responsibility of Female Employees for Causing the Coding Problem. A one-way Analysis of Variance (ANOVA) indicated that condition did not significantly affect the measure of attributions of female engineers' responsibility for causing the coding problem, $F(2, 329) = 1.36$, $p > .250$, partial $\eta^2 = .008$. Contrast analyses revealed that the internal barriers condition ($M = 3.13$, $SD = 1.60$) did not differ from baseline ($M = 2.82$, $SD = 1.39$), $F(1, 329) = 2.29$, $p = .131$, nor from the combined barriers condition ($M = 3.09$, $SD = 1.62$), $F(1, 329) = 0.04$, $p > .250$. The baseline condition and the combined barriers condition also did not differ on attributions of female engineers' responsibility for causing the problem, $F(1, 329) = 0.04$, $p > .250$.

Perceived Effectiveness of Structural Change (vs. Female Employees' Self-Change).

A one-way Analysis of Variance (ANOVA) indicated that condition significantly affected perceived effectiveness of structural change, $F(2, 329) = 6.99$, $p = .001$, partial $\eta^2 =$

0.041. Contrast analyses revealed that participants in the internal barriers condition perceived that changing the organizational structure is less effective (M = 5.55, SD = 1.33) than did participants in the baseline condition (M = 6.12, SD = 1.04), $F(1, 329) = 12.65$, $p < .001$. Similarly, participants in the combined barriers condition perceived that changing the organization structure is less effective (M = 5.68, SD = 1.31) than participants in the baseline condition, $F(1, 329) = 7.24$, $p = .007$. The internal barriers condition and the combined barriers condition did not differ on perceived effectiveness of structural change, $F(1, 329) = 0.63$, $p > .250$.

Condition also significantly affected the perceived effectiveness of female engineers changing themselves via workshops and training, $F(2, 329) = 4.04$, $p = .018$, partial $\eta^2 = 0.024$. Contrast analyses revealed that participants in the internal barriers condition perceived that female engineers' self-change would be more effective (M = 4.29, SD = 1.30) than did participants in the baseline condition (M = 3.77, SD = 1.39), $F(1, 329) = 7.82$, $p = .005$. The combined barriers condition (M = 4.10, SD = 1.53) and the baseline condition did not differ on perceived effectiveness of female engineers' self-change, $F(1, 329) = 3.13$, $p = .077$; the internal barriers condition and the combined barriers condition also did not differ on perceived effectiveness of female engineers' self-change, $F(1, 329) = 0.93$, $p > .250$.

Role of Anti-Egalitarianism Beliefs. To explore whether these effects might be stronger for participants who endorse anti-egalitarianism beliefs, we tested whether there are significant interactions between the condition manipulations and participants' SDO score, on all the possible dependent measures. None of these interactions was significant (all $p > .055$).

Mediation Analyses. For exploratory purposes, we assessed whether attributions of women's responsibility for causing or fixing the gendered coding problem acted as mediators on

perceived effectiveness of the two types of interventions. These analyses examine whether one or the other process played a larger role in shaping preferences for interventions. In both, we used regression for testing a mediation with a multi-categorical independent variable. We used the indicator coding approach (PROCESS Model 4; Hayes & Preacher, 2014) and created two dummy variables (one for each condition: dummy code = 1 if a case is in the group and dummy code = 0 otherwise), using the baseline condition as the reference group (see Table 8 for details on indicator coding). We then estimated the relative indirect effects of each condition (internal barriers and combined barriers) compared to the baseline condition, using 95% bias-corrected bootstrap confidence intervals (with 10,000 bootstrap samples).

The mediation analysis looking at the effectiveness of structural change interventions revealed a significant relative indirect effect of the internal barriers (vs. baseline) condition via responsibility of female engineers for fixing the gendered coding problem, $b = 0.06$, $SE = 0.03$, 95% CI = [0.014, 0.144]. Responsibility of female engineers for causing the problem was not a significant mediator, $b = -0.12$, $SE = 0.08$, 95% CI = [-0.305, 0.027]. We found a significant relative indirect effect of the combined barriers (vs. baseline) condition via responsibility of female engineers for fixing the problem, $b = 0.05$, $SE = 0.03$, 95% CI = [0.010, 0.147]. However, responsibility of female engineers for causing the problem was not a significant mediator, $b = 0.10$, $SE = 0.08$, 95% CI = [-0.291, 0.052]. Next, we conducted the same mediation analysis, this time using the combined barriers condition as the reference group. The relative indirect effect of the internal barriers (vs. combined barriers) condition via responsibility of female engineers for fixing the problem was not significant, $b = 0.002$, $SE = 0.02$, 95% CI = [-0.053, 0.058]. Responsibility of female engineers for causing the problem was also not a significant mediator, $b = 0.10$, $SE = 0.08$, 95% CI = [-0.046, 0.292].

The mediation analysis looking at the effectiveness of female employee's self-change interventions revealed a significant indirect effect of the internal barriers (vs. baseline) condition via responsibility of female engineers for fixing the gendered coding problem, $b = 0.11$, $SE = 0.05$, 95% CI = [0.024, 0.257]. A relative indirect effect of the internal barriers (vs. baseline) condition via attributions of female engineers' responsibility for causing the problem was not significant, $b = 0.03$, $SE = 0.03$, 95% CI = [-0.004, 0.126]. We found a significant indirect effect of the combined barriers (vs. baseline) condition via responsibility of female engineers for fixing the problem, $b = 0.10$, $SE = 0.06$, 95% CI = [0.014, 0.262]. A relative indirect effect of the combined barriers (vs. baseline) condition via attributions of female engineers' responsibility for causing the problem was not significant, $b = 0.03$, $SE = 0.03$, 95% CI = [-0.008, 0.125]. Next, we conducted the same mediation analysis, this time using the combined barriers condition as the reference group. The relative indirect effect of the internal barriers (vs. combined barriers) condition via responsibility of female engineers for fixing the problem was not significant, $b = 0.004$, $SE = 0.05$, 95% CI = [-0.100, 0.100]. Responsibility of female engineers for causing the problem was also not a significant mediator, $b = 0.004$, $SE = 0.03$, 95% CI = [-0.047, 0.078].

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