Climate Control: The Relationship Between Social Identity Threat and Cues to an Identity-Safe Culture

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Social identity threat has been proposed as a key contributor to the underrepresentation of women in Science, Technology, Engineering, and Math (STEM), but little research has sought to pinpoint naturally occurring contextual predictors of identity threat for women already training or working in STEM. The focus of the present research was to examine how cues to an identity-safe culture predict more or less positive interactions between men and women in STEM in ways that may trigger or minimize women's daily experience of social identity threat. Specifically, we examined the role of inclusive organizational policies and/or greater female representation as 2 identity safety cues. In 2 daily diary studies of working engineers' experiences, and in an experiment with undergraduate engineering students, we tested a model whereby cues to identity safety predict lower social identity threat for women in STEM, as mediated by having (or expecting to have) more positive interactions with male (but not female) colleagues. Results across each study and an internal meta-analysis of overall effects revealed that female engineers' actual and anticipated daily experience of social identity threat was lower in organizations perceived to have more gender-inclusive policies (but was not consistently predicted by gender representation). The link between gender-inclusive policies and lower social identity threat was mediated by women having (or expecting to have) more positive conversations with male (and not female) colleagues, and was only found for women and not men. The implications for reducing social identity threat in naturalistic settings are discussed.

Keywords: culture, gender, social identity threat, subtle bias, women in STEM

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Science, technology, engineering, and math (STEM) careers are failing to attract and retain qualified women. The situation is especially dire in engineering, where women make up only 10% to 13% of professional engineers in North America and 40% leave the profession in the first five years (Hill, Corbett, & St. Rose, 2010; Hunt, 2010). Women in STEM often report experiencing social isolation, difficulty gaining respect, and gender stereotyping (Williams & Dempsey, 2014; Rosser & Lane, 2002; Seron, Silbey, Cech, & Rubineau, 2016). Nearly one third of women report that they leave or avoid engineering because aspects of the culture seem unwelcoming to women (Fouad & Singh, 2011). Women's

attrition from these careers represents a lost socioeconomic opportunity when the demand for such highly trained professionals continues to outstrip supply, and the turnover of talented employees can be costly to organizations. Applying social identity threat as a theoretical lens, our goal was to identify aspects of the workplace that predict more positive interactions for men and women in STEM in ways that might minimize women's daily experience of social identity threat. Specifically, we examined the role of inclusive organizational policies and/or greater female representation as two potential cues to an identity safe organizational culture. In the present study, we tested whether either of

these cues might predict lower levels of social identity threat for women in engineering, as mediated by women feeling more accepted during interactions with their male colleagues, in particular.

Social Identity Threat for Women in STEM

Social identity threat has been proposed as a key contributor to women's underperformance and low participation in STEM settings. According to early conceptualizations (Branscombe, Ellemers, Spears, & Doosje, 1999; Steele, Spencer, & Aronson, 2002), individuals can face a number of different types of threats based on their membership in a social group. Research on stereotype threat among women has traditionally focused on their concern that their poor performance in STEM domains can be seen as confirming a negative stereotype about women's presumed incompetence in science and math (e.g., Shapiro & Williams, 2012; Spencer, Steele, & Quinn, 1999). More recently, research has also begun to explore the extent to which contexts can cue broader threats to acceptance and belonging for women in STEM (e.g., Good, Rattan, & Dweck, 2012; London, Rosenthal, Levy, & Lobel, 2011; Walton & Carr, 2012). In short, because they are often stereotyped to be worse at math and are underrepresented in many STEM fields, women struggle with feeling that they are both incapable and unwelcome in many STEM settings (Dasgupta & Stout, 2014).

Prior research on women's experience of social identity threat in STEM settings has most often focused on academic outcomes or the experience of student populations. Indeed, reminders of gender stereotypes can at times undermine women's performance on quantitative tests (e.g., Good, Aronson, & Harder, 2008; Smith & White, 2002; Spencer et al., 1999; Walton & Spencer, 2009) and/or lead them to avoid STEM majors and careers where they feel they do not belong (Cheryan, Plaut, Davies, & Steele, 2009; Davies, Spencer, & Steele, 2005; Murphy, Steele, & Gross, 2007). Yet to extend our understanding of how social identity threat affects women's underrepresentation across all STEM settings, there is a growing call for more research that seeks to understand these processes after women complete their education and enter into the workplace (Emerson & Murphy, 2014; Walton, Murphy, & Ryan, 2015). Given that social identity threat is thought to be elicited by contextual features that signal, often in subtle ways, identity safety or alienation, we aim to understand how organizations cue a cultural mindset of identity safety in ways that might theoretically influence how members of different groups relate to one another in that setting. The degree of positivity of those interactions, we believe, is a key predictor of women's experience of social identity threat.

In the present study, we examine gender-based social identity threat, that is, a person's concern that they are being perceived or evaluated through the lens of their gender. Although women working in STEM careers do not encounter the same kind of diagnostic tests shown to trigger stereotype threat among student samples, they often work in team situations requiring open debate over ideas, criteria, methods, and solutions for technical design problems. Given the collaborative nature of work in science and engineering, we reasoned that women's workplace conversations with their male colleagues could trigger naturalistic experiences of social identity threat. We believe these subtle experiences of social identity threat are distinct from more overt negative comments that have been the focus of other research on workplace hostility (Andersson & Pearson, 1999; Baron & Neuman, 1996; Berdahl & Raver, 2011; Williams & Dempsey, 2014; Rayner & Hoel, 1997; Rospenda & Richman, 2004).

Only a handful of studies have tried to understand the ways in which social identity threat might be cued and experienced in conversational settings. Some research has focused on the presumed or actual biases of men as triggers of social identity threat processes. For example, women are more likely to underperform on a task when they believe their male instructor might hold gender biases (Adams, Garcia, Purdie-Vaughns, & Steele, 2006). Other research suggests that women can experience social identity threat even when they are relatively unaware of the implicit biases their male conversation partner holds. Logel and colleagues (2009) found that after having an initial conversation with a male peer who harbors more implicit (but not necessarily explicit) stereotypes about women, female engineering students subsequently performed more poorly on an engineering task. In Logel's research, men with more implicit biases struck a more dominant posture and flirtatious demeanor during their interactions with female peers. Although women liked men more when they behaved in this way, their performance was impaired by falling into these gendered scripts for interpersonal interactions.

To complement these experimental findings, research has begun to capture the ways in which women's conversations with their male colleagues in the workplace sometimes naturalistically cue social identity threat. For example, a naturalistic observation study of workplace conversations among scientists revealed that among men, the more their research conversations with their male colleagues at work focused on research, the more engaged they reported being with their work. For women, however, the more their conversations with male (but not female) colleagues focused on research, the more disengaged they reported being with their work (Holleran, Whitehead, Schmader, & Mehl, 2011). These findings are consistent with the work of von Hippel, Issa, Ma, and Stokes (2011) demonstrating that professional women report greater social identity threat when they self-report comparing themselves with male (vs. female) colleague.

Importantly, however, women's conversations with male colleagues in STEM settings need not always be detrimental to women's experience in STEM. A study of working engineers employed a daily diary methodology to more directly examine day-to-day fluctuations in women's and men's experience of social identity threat at work (Hall, Schmader, & Croft, 2015). In this study, engineers were asked to report on their daily workplace interactions and daily experience of social identity threat over 10 consecutive work days. Results revealed that only on days when women had conversations with their male colleagues that engendered a lack of acceptance and competence, they also experienced higher levels of social identity threat, measured as a general concern with being evaluated through the lens of gender. Moreover, on days when women reported greater social identity threat, they also reported greater mental exhaustion and disengagement from their work. Reactions to daily conversations were unrelated to these same outcomes for women when they were speaking with their female colleagues, or for men when speaking to colleagues of either sex. These effects, which were recently replicated in two additional samples (Hall, Schmader, Aday, & Croft, 2018), suggest that men might play a large role (perhaps more so than other women) in shoring up women's feelings of acceptance and com-

petence and eliminating women's experience of social identity threat. However, this past research has not shed much light on what cultural cues within an organization predict women's experience of being accepted by their male colleagues. This is the focus on the present work.

Identity-Safe Cultural Cues as a Predictor of Social Identity Threat

Cultures and the people within them mutually constitute themselves (Markus & Kitayama, 2010). This contemporary social psychological frame on what culture is informs how we think about the local culture of an organization. On the one hand, organizational cultures provide a broad system of norms, beliefs, and practices that govern institutional messages and daily experiences, including social interactions. Those experiences and interactions then reinforce an individual's sense of identity within that organization. But individuals' ways of seeing themselves can also dictate both how they interact with others and how they perceive those interactions (Chatman & Barsade, 1995; Pinel, 1999), and these emergent norms of interactions can come to define and change an organizational culture (Schein, 2004). Thus, both interpersonal and situational cues within an organizational culture interact to predict the individual's response to a given situation (e.g., Chatman, 1989; Terborg, 1981). Similarly, social identity threat has been proposed to be triggered from both relational and contextual cues (Steele et al., 2002). Yet prior research has done little to understand the link between the two. In the context of STEM organizations, we surmised that organizational cues to an identity-safe culture would relate to lower social identity threat for women by either directly cuing fewer concerns with gender-based evaluation among women or indirectly by promoting more (perceived or actual) accepting interactions between men and women.

Research has shown that contextual factors that signal inclusive academic settings can reduce social identity threat for women and minorities and allow them to perform up to their potential (for a review see Murphy & Taylor, 2012; Walton & Spencer, 2009). Drawing from such research, we considered two different contextual factors that might signal an identity-safe workplace culture for women: (a) the awareness of gender-inclusive workplace policies designed to promote gender equality in their organization and, (b) the awareness of a higher than average proportion of women employed in the workplace. Each of these two factors has been specifically associated with lower ratings of identity threat in academic and workplace contexts (e.g., Inzlicht & Ben-Zeev, 2000). For instance, Purdie-Vaughns and colleagues (2008) found that African Americans reported increased expectations of threatening identity contingencies and lower trust of the corporate setting when imagining working for a company that has both color-blind policies and low minority representation. However, when the company inserted a brief statement advocating for fairness, African Americans' identity-threatening contingencies were not activated and trust in the company was maintained even if minority representation was low.

Although these two contextual cues, inclusive policies and numerical representation, might often relate to and inform one another (e.g., Apfelbaum, Stephens, & Reagans, 2016), they are clearly distinct. Inclusive policies sometimes serve as a more powerful cue to identity safety than numerical representation

(Purdie-Vaughns et al., 2008). After all, the mere presence of women does not necessarily indicate a gender-fair culture, as women can sometimes be just as biased as men in their evaluations of other women (Derks, Ellemers, van Laar, & de Groot, 2011).

Similarly, the mere existence of diversity policies in an organization may not be a valid cue of identity safety for members of devalued groups, even though people do assume that the presence of diversity policies creates an identity safe environment. For example, in scenario studies, the presence of organizational diversity structures decreases the likelihood that social perceivers attribute negative but ambiguous outcomes to discrimination (Kaiser et al., 2013). No prior research has examined whether the perceived presence of inclusive policies in a real, as opposed to imagined, organizational setting does indeed predict reduced social identity threat for members of devalued groups. In the present work, we investigated the degree to which employees' perceptions of these two distinct cues to an identity-safe workplace (i.e., the perceived representation of women and gender-inclusive policies) predict not only women's anticipated, but also their actual, experience of social identity threat in science and engineering.

We theorize that by hiring more women or by establishing gender-inclusive policies, companies might signal a cultural mindset that predicts lower levels of social identity threat for women working in male-dominant settings. Indeed, some prior evidence demonstrates that gender-inclusive policies can have benefits for women. Organizations that are perceived to have strong diversity policies are rated as more attractive and predict higher job satisfaction (Choi & Rainey, 2014; Williams & Bauer, 1994). Furthermore, in a study tracking a national sample of private sector firms over 30 years, researchers found a significant increase in the share of women and minorities in management positions following the implementation of structures designed to increase organizational responsibility (Green & Kalev, 2009). Other organizational research suggests that having more women in an organization promotes more positive workplace interactions and group cohesion. For example, gender diversity in large firms is linked to increased constructive group processes and team cooperation (Kochan et al., 2003). In addition, women are more successful in highly network-based fields, such as bio-tech, that reward collectivism and positive relationships (Smith-Doerr, 2004; Whittington & Smith-Doerr, 2008). This greater emphasis on collaboration and egalitarian relationships, in turn, is linked to reduced workplace discrimination (Green & Kalev, 2009).

This prior work offers some reason to believe that women working for companies with either more gender-inclusive policies or a higher proportion of women might have more positive workplace experiences. Yet these past studies have focused on broad outcomes and perceptions among women, and not how these cues to identity safety might relate to women's day-to-day interactions with colleagues, as well as their daily experience of identity threat. The present work looks to address these shortcomings by testing the hypotheses that institutional signals of identity safety predict fewer daily experiences of social identity threat among women in STEM, perhaps because they feel more accepted in their daily interactions with male colleagues. We acknowledge that women might feel more accepted by their male colleagues in gender-inclusive environments because the cultural norms influence men's behavior toward women, influence women's interpretations of men's behavior, or some dynamic combination of both. Al-

though the current research does not enable us to tease apart these distinctions, this is the first set of studies to use a mixed methods approach to investigate how an identity-safe culture can predict women's feelings of acceptance from men, as distinct from reducing explicitly hostile experiences that might be directly proscribed by a company's gender-inclusive policies.

Although our primary hypotheses concern the predictive effects of gender-inclusive policies and/or a higher representation of women in STEM workplaces for women's experiences, we were also interested in exploring the effect of these same contextual cues of an identity-safe culture for men. On the one hand, if men working in a more gender-inclusive workplace actually have more positive interactions with women, they might be less likely to feel evaluated based on their gender identity (i.e., resulting from a concern that they are seen as sexist). This possible prediction that cues to identity safety might predict lower social identity threat for men is consistent with other work theorizing that cultural diversity can benefit both majority and minority group members (Apfelbaum, Phillips, & Richeson, 2014; Apfelbaum et al., 2016; Crisp & Turner, 2011; Kaplan, Wiley, & Maertz, 2011).

On the other hand, cues to identity safety for women could predict greater feelings of social identity threat for men. When poorly implemented, diversity programs can incite increased reactance, identity salience, and intergroup conflict (Fiol, Pratt, & O'Connor, 2009; Lee, Faulkner, & Alemany, 2010; Martins & Parsons, 2007; Morrison, Plaut, & Ybarra, 2010; Paluck, 2006; Sanchez & Medkik, 2004; Thomas & Plaut, 2008). If men perceive the presence of these policies in this way, they might experience tension during cross-sex interactions and elevated concerns with how their gender is viewed at work.

A third possibility is that inclusive policies and gender representation that benefit women could have relatively little effect on men, who, given their majority standing, have less reason to be vigilant to gender-based cues in the environment. This is typically what has been found in lab studies that manipulate contextual factors such as female representation in a STEM setting (e.g., Dasgupta, Scircle, & Hunsinger, 2015; Murphy et al., 2007). Although our primary hypotheses focus on women's responses to an identity-safe workplace culture, we conducted parallel analyses on men and tested for interactions with participant gender to explore these alternative possibilities.

Present Research

Across three studies we examined gender-inclusive policies and female representation as two distinct organizational cues that could predict women's experience of social identity threat in a STEM workplace. In Study 1, we experimentally manipulated the gender inclusivity of an imagined engineering workplace and measured the degree to which engineering undergraduates expected to experience social identity threat and have positive workplace interactions while working at a STEM company. Studies 2 and 3 test these effects in two daily diary studies of actual male and female professional engineers' daily experiences of social identity threat as predicted by their reports of these identity safety cues in their workplaces and daily experiences of acceptance during conversations with male and female colleagues.

Across the three studies, we tested hypotheses that the perceived organizational cues to an identity-safe culture (gender-inclusive
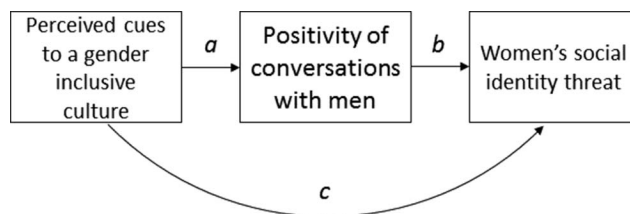

Figure 1. Theoretical model of gender-inclusive cultural cues predicting women's lower experience social identity threat as mediated by more positive conversations with men.

policies and female representation) would relate to lower levels of women's social identity threat either directly by acting as a signal of an identity safe environment, or indirectly by predicting more accepting interactions with male (and not with female) colleagues. An overview of the proposed model can be seen in Figure 1. In each study, we also tested competing hypotheses about how cues to identity safety predict men's outcomes.

Finally, in each study, we conducted focal analyses controlling for individual differences in stigma consciousness to understand whether and how contextual factors predict experiences of social identity threat as distinct from more chronic concerns that women (and men) might have with being stigmatized by their gender. In Studies 2 and 3, we also tested the possibility that dispositionally positive people have a general tendency to construe everything more positively that better accounts for the relationships we find between reported gender-inclusive policies and our focal variables. All of these analyses are described in detail in the online supplemental materials.

Study 1

Overview

Study 1 adapted experimental methodologies used in prior research to manipulate the presence of identity safe cues in an engineering company (Kaiser et al., 2013; Purdie-Vaughns et al., 2008) and measured how students would expect to feel working at that company. Engineering undergraduates watched a video about a fictitious engineering company and learned that the percentage of women in the company was either high or low and, orthogonally to the first factor, that several gender-inclusive policies either were present or absent at the company. We tested the hypothesis that either of these identity safe cultural cues would reduce women's anticipated identity threat, in particular, by increasing their likelihood of anticipating positive workplace interactions.[1]

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[1] Study 2 was conducted first and hypotheses guiding this paper were generated based on results from that initial study. Hypotheses and measures for Studies 1 and 3 were preregistered in the first author's dissertation proposal (approved in May 2015 and on file at the University of British Columbia) before Study 1 was conducted and data from Study 3 were analyzed. We present the studies in this order to improve readability because Study 3 is more methodologically similar to Study 2. Focal measures were chosen to replicate key effects that were found in Study 2. Other measures added in Studies 1 and 3 were included to establish the robustness of our results to various theoretically relevant covariates.

Method

Sample and recruitment. Participants from undergraduate engineering programs were recruited via e-mail advertisements sent out on university listservs. One hundred eleven engineering departments were initially invited to share the study information on their student listservs. The final sample included 258 (152 women and 106 men) engineering undergraduates from 11 different universities. This sample includes only those participants who completed all measures.[2] Data collection continued until we had at least 100 participants of each gender; our a priori target was designed to double the sample size from Study 2, which was conducted first.

Participants had completed 2.64 ($SD = 1.35$) years of university and had an average age of 21.08 years ($SD = 2.76$). There were no gender differences on the number of years of university completed ($M_{male} = 2.68$, $M_{female} = 2.61$, $t(244) = -.43$, $p = .665$), but men tended to be somewhat older than women in the sample ($M_{male} = 21.47$, $M_{female} = 20.80$, $t(243) = -1.86$, $p = .065$). Age was not a significant covariate when included in any of the primary analyses ($ps > .35$) and thus was not retained in any of the reported statistical models. Participants were compensated with entry into a prize drawing for a $50 Amazon gift card, with a one in 50 chance of winning.

Design and procedure. Participants were invited to take part in an online study about attitudes toward engineering workplaces. In the first part of the study, participants watched a short video about an engineering company called CCB and purported analysis of CCB's demographics, policies, and practices. To manipulate the *representation of women* in the company, participants were first exposed to demographic information about CCB's engineering workforce displayed in pie charts and group photos of employees. In the low female representation condition, participants learned that 10% of the engineering workforce at CCB is female. For the high representation condition, participants learned that 40% of the engineering workforce at CCB is female (see supplemental materials for screenshots). These numbers were selected to represent realistic values based on our findings from Study 2 showing that female representation at engineering companies ranged between 0% and 50%. These percentages were reinforced by pictures that were ostensibly of CCB employees, pilot tested to differ in female representation but otherwise matched on perceived age, ethnic diversity, and education level.

To manipulate the presence of *gender-inclusive policies,* the video presented two checklists that always detailed seven policies and practices that the report had identified as being in place at CCB and four policies that were lacking at CCB. In the high gender-inclusive policy condition, five of the seven policies that were present and none of the absent policies were gender inclusive (e.g., "Programs and workshops to create cultural norms for positive working relations between genders"). In the low gender inclusivity condition, only two of the seven policies that were present at CCB were gender inclusive, but three of the four absent policies were gender inclusive. The spread between the high and low gender inclusive conditions (five versus two) reflected one standard deviation above and below the mean of actual perceived presence of these same policies when rated by working engineers in Study 2. The other six policies were unrelated to gender and were created based on commonly used policies and practice in

engineering companies (e.g., "reimbursements for relevant classes or degree programs").

The video ended with a summary of the findings of the report that further emphasized the manipulation (e.g., "CCB's company policies and programs currently include seven of 11 of the best practices in the industry."). After viewing the video, participants spent two minutes imagining what it would be like to work at CCB before completing the dependent measures and providing demographic information.

Dependent measures. Below we describe the dependent measures relevant to the present research questions; a complete list of measures used in this research can be found in the online supplemental materials, as well as supplemental analyses of nonfocal outcome variables.

Anticipated conversation ratings. Participants were asked "If you worked at CCB, how often do you think you would feel the following during your interactions with other engineers?" Two items assessed anticipated feelings of competence and acceptance, $r = .53$, $p < .001$, during interactions with engineering colleagues. These were intended to correspond to threats to competence and belonging that are often implicated when people experience social identity threat. In addition, two items assessed expectations of conflict and hostility, $r = .73$, $p < .001$ to provide a measure of more overtly hostile interactions. Ratings were made on a 1–7 scale ranging from *never* to *always*. Although the gender of others at CCB was not specified in these items to avoid drawing attention to the hypotheses, we assumed that participants would typically imagine speaking with men given the low representation of women in engineering.

Anticipated social identity threat. Participants completed a version of the social identity threat measure used in Hall et al. (2015), modified to reflect the anticipation of social identity threat as an employee in the company ($\alpha = .89$; "If you worked at CCB, how often do you think that people would think about your gender when judging you?"; "If you worked at CCB, how often would you worry that people might judge you because of what they think of your gender?";, "If you worked at CCB, how often would you worry that people would judge your gender because of your behavior?"; and "If you worked at CCB, how often would you worry about other people of your gender acting in ways that confirm gender stereotypes?") and were rated on a scale from on a 1–7 scale ranging from *never* to *always*.

Manipulation checks. As a check of the female representation manipulation, participants were asked, using an 11-point scale (0%–100%), to estimate the number of female engineers employed at CCB. To check the manipulation of gender-inclusive policies, participants rated their agreement with following statement, using a 1–7 scale (1 = *strongly disagree*; 7 = *strongly agree*): "CCB has a large number of policies/practices that would benefit female employees." Finally, to ensure that participants were paying attention to the video, they were asked to complete a memory test. Participants were presented with the

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[2] An additional 443 participants started the survey but did not complete it. Because gender was assessed at the end (to avoid priming it earlier), possible gender differences in attrition are unknown. However, there was no significant difference in attrition due to condition.

11 policies that were shown in the video and asked to check the ones that were present at CCB.

Results

Manipulation checks.

Gender-inclusive policies. First, we tested that the manipulation of the number of gender-inclusive policies changed participants' perception of how many gender-inclusive policies were present at the company in the video. A 2 (female representation: high vs. low) × 2 (gender-inclusive polices: high vs. low) × 2 (gender: male vs. female) ANOVA on participants' perception of gender-inclusive policies revealed the predicted main effect of the policy manipulation, $F(1, 238) = 7.16$, $p < .01$, $d = .37$, 95% CI[.11, .62], such that participants in the high gender-inclusive policy condition reported there were more gender-inclusive policies ($M = 4.42$; $SD = 1.29$) than did participants in the low gender-inclusive policy condition ($M = 3.97$; $SD = 1.26$). No other main effects or interactions were significant, $ps > .10$.

Of note, the analysis of participants' memory for policies at the end of the study revealed that participants' average performance on the memory test was 8.74 ($SD = 2.32$; Range = 2–11) of a possible 11, which is significantly greater than chance, $t(245) = 25.27$, $p < .001$. Unexpectedly, participants exhibited better memory for policies in the high ($M = 9.03$, $SD = 2.12$) than in the low gender-inclusive policy condition ($M = 8.32$, $SD = 2.46$), $F(1, 238) = 5.79$, $p = .017$, $d = -.36$, 95% CI [−.61, −.11]. See online supplemental materials for some indication that this effect might have been driven by women. These differences in memory at the end of the session might be generative for future research but do not affect the hypotheses being tested given that memory was generally high and the manipulation was perceived as intended.

Female representation. As expected, a 2 (female representation: high vs. low) × 2 (gender-inclusive polices: high vs. low) × 2 (gender: male vs. female) ANOVA on participants' perceptions of the percentage of women revealed the predicted main effect of female representation, $F(1, 238) = 89.72$, $p < .001$, $d = 1.28$, 95% CI [1.00, 1.56]. Participants in the high representation condition reported that more female engineers were employed at the company ($M = 36.8\%$, $SD = 9.4\%$) than did participants in the low representation condition ($M = 22.5\%$, $SD = 13.7\%$). Although no other main effects were significant, $p > .35$, a marginal participant gender by female representation interaction, $F(1, 238) = 4.31$, $p = .072$, suggesting that this simple main effect of representation was somewhat larger for female participants, $d = -1.47$, 95% CI [−1.84, −1.10]) than for male participants, $d = -1.00$, 95% CI [−1.42, −.58]).

There was also an unexpected significant interaction between participant gender and the manipulation of gender-inclusive policies, $F(1, 238) = 9.85$, $p < .01$. Men recalled a higher percentage of female engineers in the low as compared with high gender-inclusive policy condition $t(238) = 2.63$, $p = .009$, $d = -.52$, 95% CI [−.92, −.13]. Women, in contrast, tended to recall a higher percentage of women in the high as compared with low gender-inclusive policy condition, $t(238) = .1.75$, $p = .081$, $d = .29$, 95% CI [−.04, .61]. Because this effect was unexpected and this measure came at the very end of the study, we hesitate to draw conclusions about it. Furthermore, as our primary predictions concern effects of these manipulations on women (who are per-

haps simply showing more attention to this variation), these significant differences among male participants are less problematic for testing our core hypotheses.

Anticipated social identity threat. We next tested our primary hypothesis that cues to an identity-safe culture would predict variation in anticipated social identity threat among women (and perhaps not men). A 2 (female representation: high vs. low) × 2 (gender-inclusive polices: high vs. low) × 2 (gender: male vs. female) ANOVA on anticipated social identity threat revealed main effects of gender, $F(1, 238) = 81.62$, $p < .001$, and gender-inclusive policies, $F(1, 238) = 5.77$, $p = .017$, that were qualified by a significant three-way interaction, $F(1, 238) = 4.66$, $p = .032$ (see Figure 2).

For female participants, there were significant simple main effects of gender-inclusive policies, $t(238) = -2.26$, $p = .025$, $d = -.38$, 95% CI [−.81, −.05] and female representation, $t(238) = -2.87$, $p = .004$, $d = -.49$, 95% CI [−.92, −.06], but a nonsignificant interaction between the two, $t(238) = -1.26$, $p = .209$. As hypothesized, women anticipated less social identity threat in a company with more rather than fewer gender-inclusive policies ($M_{high} = 4.02$, $SD = 1.33$; $M_{low} = 4.55$, $SD = 1.39$) and in a company with more rather than fewer women ($M_{high} = 3.96$, $SD = 1.36$; ($M_{low} = 4.59$, $SD = 1.35$).

In contrast, among men, there was only a marginal main effect of female representation, $t(238) = 1.81$, $p = .072$, $d = .37$, 95% CI [−.15, .89], that was qualified by a marginal interaction with gender-inclusive policies, $t(238) = 1.76$, $p = .080$. Although men's ratings of social identity threat were generally quite low compared with women's, men anticipated being more aware of their gender in a company with a higher number of gender-inclusive policies and a high number of women ($M = 3.02$, $SD = 1.31$) as compared with a low number of women ($M = 2.07$, $SD = 1.31$), $t(238) = 3.52$, $p = .012$, $d = .73$, 95% CI [.00, 1.47]. When the company had few gender-inclusive policies, the representation of women had no effect on men's anticipated social identity threat (high representation, $M = 2.89$, $SD = 1.08$ low representation, $M = 2.87$, $SD = 1.46$), $t(238) = .04$, $p = .971$, $d = .01$, 95% CI [−.73, .75].
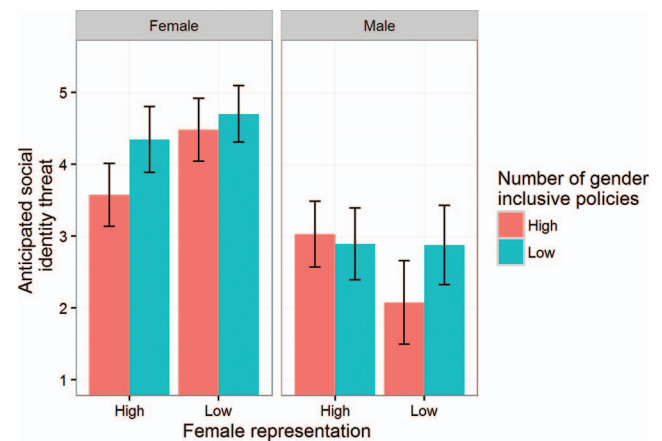

Figure 2. Mean anticipated social identity threat for male and female participants in each of the experimental conditions in Study 1. Error bars represent 95% confidence intervals. See the online article for the color version of this figure.

Another way to examine the three-way interaction is to ask whether cues to identity safety ever eliminate the gender difference in anticipated social identity threat. Indeed, only when viewing a company with more women and more gender-inclusive policies did women report similar, albeit still marginally higher, levels of anticipated social identity threat ($M = 3.57$) as did men ($M = 3.02$), $t(238) = 1.71$, $p = .080$, $d = .42$, 95% CI [−.21, 1.05]. In all other conditions, the gender difference was larger and significant, ps <.01, ds >1.15. This result is consistent with the idea that for women, the presence of cues to identity safety can be distinctly effective at reducing anticipated social identity threat.

Anticipated conversation positivity. To test the effect of these experimental manipulations on participants' expectations about their conversations with work colleagues, we conducted a 2 (female representation: high vs. low) × 2 (gender-inclusive policies: high vs. low) × 2 (gender: male vs. female) ANOVA on anticipated conversation positivity. This analysis revealed no significant main effect ($p > .25$) or interactions involving female representation (ps > .10): There was no evidence that women (or men) expected to have more positive interactions working for a company simply because more women worked there. Because gender representation had no effect in the model, we reran the analysis including it only as a covariate. We did this to conserve degrees of freedom and to be consistent with the analytic approach used in Studies 2 and 3, which also found no effects attributable to gender representation. The conclusions reported below are unchanged, however, by adding it as a factor.

The results of the 2 (gender-inclusive polices: high vs. low) × 2 (gender: male vs. female) ANOVA on anticipated conversation positivity revealed a main effect of gender, $F(1, 241) = 8.09$, $p = .005$, that was qualified by a significant interaction between gender and gender-inclusive policies, $F(1, 241) = 4.65$, $p = .032$. Consistent with hypotheses for women, simple effects analyses revealed that women anticipated having more positive workplace interactions at a company with more ($M = 5.00$, $SD = 0.82$) rather than fewer gender-inclusive policies ($M = 4.56$, $SD = 0.99$), $t(241) = 2.75$, $p = .006$, $d = .46$, 95% CI [.15, .78]). In contrast, gender-inclusive policies had no effect on men's anticipated interactions (high inclusive policies, $M = 5.09$, $SD = 1.05$; low inclusive policies, $M = 5.19$, $SD = 1.03$), $t(241) = −0.51$, $p = .613$, $d = −.10$, 95% CI [−.48, .28]). Examined in terms of gender differences, only when exposed to a company with a high number of gender-inclusive policies did women expect to feel as accepted and competent in conversations as their male counterparts, $t(241) = −.50$, $p = .617$, $d = −.09$, 95% CI [−.44, .25]. These findings are summarized in Figure 3.

Testing mediation.

Analytic approach. Finally, we tested whether women anticipated less social identity threat in a company with a high number of gender-inclusive cues because the presence of gender-inclusive cues led women to anticipate more positive workplace interactions. Our approach in this and all studies was to use path analyses to test a model based on that presented in Figure 1, with specific paths informed by our initial analyses on the mediator (anticipated conversation positivity) and outcome (social identity threat). Thus, because gender-inclusive policies predicted women's experiences in both analyses above, we used the R package lavaan (Rosseel, 2012) to test for an indirect effect of gender-inclusive policies on women's anticipated social identity threat through their anticipated
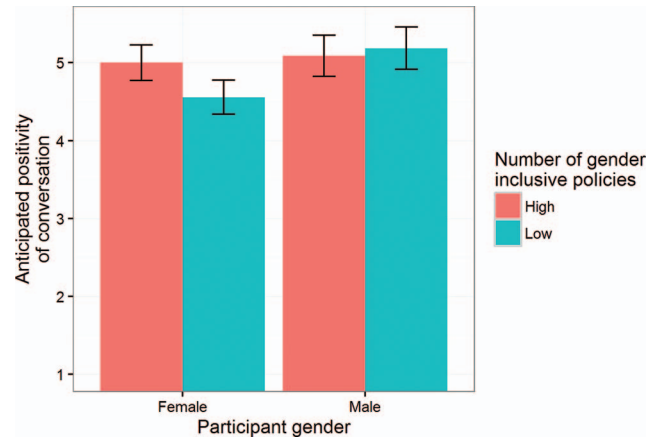

Figure 3. Mean anticipated positivity of conversations as a function of the number of gender-inclusive policies and participant gender in Study 1. See the online article for the color version of this figure.

conversations. Because the manipulation of female representation did not influence perceptions of workplace conversations (but did relate to social identity threat), we controlled for this variable but do not present a path model where it was the focal predictor.[3] However, the significance of the effects reported below are not contingent on controlling for female representation. Finally, because of our competing hypotheses about whether this same model would predict effects for men, we set up a moderated mediation model to simultaneously test indirect effects for each gender, to test each path as potentially moderated by gender, and to provide an omnibus test of moderated mediation. Confidence intervals of the indirect effects were established using bootstrapping (Rosseel, 2012). Because initial analyses revealed no evidence that path b was moderated by gender, gender was set to moderate only paths a and c.

The path model revealed a significant indirect effect for female participants, $ab = −.23$, 95% CI [−.41, −.06], $Z = 2.58$, $p = .010$, supporting our key hypothesis (see Figure 4). Women imagined having more accepting conversations with colleagues at a company with gender-inclusive policies (path $a = .45$, $Z = 2.84$. $p = .004$), and anticipating feeling accepted and competent during workplace conversations predicted experiencing less social identity threat (path $b = −.51$, $Z = −6.11$, $p < .001$). Note that a supplemental analysis testing reverse mediation (i.e., that organizational policies predict women's expectation of their interactions via reduced social identity threat) was nonsignificant, $ab = −.07$, $p = .395$.

For comparison purposes, we also tested the indirect effect of policies on social identity threat via anticipated conversations for male participants. In contrast to the pattern for women, this indirect effect was not significant for male participants, $ab = .04$, 95% CI [−.13, .21], $Z = 0.46$, $p = .648$, who showed no relationship between policies and anticipated conversations (path $a = −0.09$, $Z = −0.46$, $p = .644$), although anticipating feeling acceptance

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[3] Supplemental analyses in which female representation was tested as a predictor revealed nonsignificant indirect effects for men and women (ps > .35).

Female participants
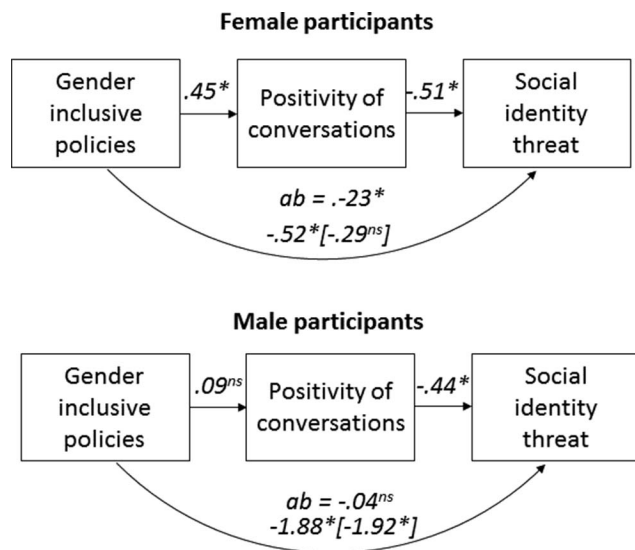

Male participants

Figure 4. Path model of gender-inclusive policies on social identity threat for female and male participants in Study 1. All effects were estimated by fitting a path model in which paths a and c were moderated by gender to allow for simultaneous estimation of relationships for male and female participants. Female participants showed a significant indirect effect of policies on social identity threat through the anticipated positivity of their conversations with colleagues; for men, the same effect was nonsignificant.

and competence during conversations also predicted experiencing less social identity threat (path $b = -.44$, $Z = -3.01$, $p = .003$). Finally, the omnibus test of moderated mediation where paths a and c were moderated by gender was significant ($ab = .26$, 95% CI [0.01, 0.51], $Z = 2.04$, $p = .042$).

Testing anticipated hostility as an alternative mediator. Although we had proposed that cues to identity safety might reduce social identity threat by signaling subtle signs of social acceptance and competence from colleagues, it is also possible that these cues instead signal the absence of more explicit forms of gender hostility that some such policies would prohibit. Participants' anticipated hostility ratings were negatively correlated with ratings of anticipated acceptance and competence, $r = -.32$, $p < .001$. However, a 2 (gender) × 2 (policies) × 2 (female representation) ANOVA on anticipated hostility revealed no significant effects, $ps > .25$. Similarly, we repeated the above path analyses testing anticipated hostility of conversations as a possible mediator of the relationship between gender-inclusive policies and social identity threat. This analysis yielded only a marginal indirect effect for women ($ab = -.16$, 95% CI [$-.33$, .02], $p = .084$) and a nonsignificant indirect effect for men ($ab = .01$, 95% CI [$-.12$, .13], $p = .919$), suggesting that the benefits of a positive workplace culture for women were not better explained by women anticipating less hostility in these settings, but were instead contingent on the expectation of feeling more competent and accepted during work conversations.[4]

Assessing the role of stigma consciousness. Because women might generally be higher than men in stigma consciousness (Pinel, 1999), in this and subsequent studies we reran our focal analyses controlling for individual differences in this variable. Our goal in this study was to assess the degree to which contextual factors predict anticipated social identity threat, controlling for variation in the chronic concerns that women (and men) might have about gender stigma. These analyses, which are detailed in the online supplemental materials, reveal that the above reported effects were robust to controlling for stigma consciousness.

Discussion

In Study 1, we observed a relationship between cultural cues to identity safety and anticipated social identity threat for female engineering undergraduates. Women anticipate that they will have fewer concerns about being evaluated through the lens of their gender if working for a company with gender-inclusive policies and/or a higher percentage of women. Men, in contrast, were relatively unaffected by these cues. Furthermore, we found evidence that young women anticipated that they would experience less social identity threat in an engineering company with more gender-inclusive policies, because they would expect to feel accepted and competent in their daily conversations with colleagues (and not because they expected less hostility). A strength of this study was our ability to experimentally manipulate the presence of cues to identity safety to isolate causal effects. This study was limited, however, by its reliance on undergraduates' anticipated experience in an imagined workplace. Although women expect these cues to reduce their experience of social identity threat, they might not be accurate about these presumed benefits. Indeed, although strong in methodological rigor, laboratory studies are often constrained in their ability to predict how phenomena play out in naturalistic settings (Mortensen & Cialdini, 2010). Another limitation of Study 1 is that when participants were asked to make ratings of anticipated feelings during work conversations, the gender of the conversation partner was not specified. This prevented us from isolating the benefits of acceptance from male versus female coworkers. Studies 2 and 3 will address these shortcomings by employing a daily diary methodology that included measures of daily experiences of social identity threat and positivity of conversations as they naturally occurred in the workplace among working engineers.

Study 2

Study 2 reports new analyses of a dataset of male and female engineers summarized in Hall et al. (2015). Importantly, that paper presented evidence that women's daily conversations with men predicted greater social identity threat on days when those conversations engendered a lack of acceptance and competence. It did not, however, consider the role of cues to inclusion in the organization predicting between-person variation, which is the key focus of the present paper. The new findings reported here are the result of exploratory analyses testing how the perceived presence of gender-inclusive policies and gender representation predicted women's experience of social identity threat. Hypotheses that guided Study 1 and Study 3 were developed and refined based on findings from this study.

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[4] Additional analyses reported in online supplemental materials suggested that both women and men expected harassment to be less likely at a company with more gender-inclusive policies, and that women in particular were somewhat more interested in working for the company if it had more rather than fewer gender-inclusive policies.

Method

Sample, recruitment, and procedure. The sample of 96 engineers (52 female, 44 male) includes only those participants who had data on all relevant study variables, as well as a sufficient number of conversations across the diary period to estimate effects. The attrition rate from the first to last survey was 21%, with men (29%) being significantly more likely to drop out than women (11%), $\chi^2 = 6.54$, $p = .011$. The 25 participants who did not complete measures beyond the first survey did not significantly differ on any of the first survey measures from the 96 participants that completed all relevant survey data.

The final sample came from 51 different engineering companies across Canada, were mostly White (77 White, eight Chinese, four South Asian, two Aboriginal, one Black, one West Asian, one Chinese/Latin American, one White/Japanese, one Chinese/Southeast Asian), and the average age was 33.5 years old (there were no gender differences on participant age).

Primary measures. Below we describe the measures relevant to the present research questions; a complete list of measures used in this research can be found in the online supplemental materials section.

Cues to an identity-safe culture. In this study, participants completed a series of online surveys on their home computer. These included 10 daily diary surveys over the course of two work weeks, as well as two longer surveys at the start and end of the two-week period. In the final survey, participants completed measures of two organizational variables that assessed an identity-safe culture. To assess perceptions of female representation, participants were asked to estimate the percentage of female engineers at their company (on a 0–100% scale); the average score was 17.88%, and the range was 0% to 50%. In addition, the perception of gender-inclusive policies and practices was assessed with a 15-item checklist (Hughes, 2012; see online supplemental materials). Participants responded to items such as, "Does your organization have physical working conditions (equipment, clothing, shower, and toilet facilities) appropriate for men and women?" For each item participants had the following response options: "Yes," "No," and "I don't know." The number of "Yes" responses was summed for each participant. Scores on this scale ranged from 2–15. These two organizational variables were moderately positively correlated, $r = .35$, $p < .001$.

Daily social identity threat. In each daily diary survey, participants rated two items to assess daily social identity threat on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*): "Today at work, I felt very aware of my gender," "Today at work, I was concerned that, because of my gender, my actions influenced the way other people interacted with me" (*r*s ranged from .70–.92).

Daily conversations. Each day, participants completed a modified version of the Rochester Interaction Record (Wheeler & Nezlek, 1977). They were asked to recall the three most significant face-to-face conversations they had while at work that day and identify the topic of conversation (work, social, or both), as well as the gender of, and their own relative status to (1 = *much lower status*, 7 = *much higher status*), their conversation partner. Participants rated how positively they felt during the conversation on a series of nine semantic differential items (e.g., 1 – *relaxed*; 7 – *anxious*). For more details about this measure, see Hall et al. (2015).

Demographic variables. Demographic variables included participants' age, ethnicity, level of education, number of prior career positions, personal salary, gross salary, number of children, marital status, and job status (i.e., "What is your position/title" with five response options ranging from 1 = *engineer in training* to 5 = *executive director, and senior management*. See the online supplemental materials for analyses of gender differences on these variables).

Results

Analytic strategy. Because our data included within-person assessments of both conversations and social identity threat, Study 2 (and Study 3) used multilevel modeling to test core hypotheses. All models were estimated using R's multilevel model lme4 package (Version 1.1.12; Bates et al., 2015) under restricted maximum likelihood. Between-person predictor variables at level 2 (i.e., cues to an identity-safe culture) were entered into models as grand mean centered. In models where conversation ratings are considered a predictor of social identity threat or as a mediator, we modeled estimates of the between-participants effects of this variable (e.g., see Enders & Tofighi, 2007; Kreft & de Leeuw, 1998). This allowed us to test whether perceptions of identity safe cultural norms relate to better conversations averaged across the 10-day diary period, which then predicts lower social identity threat averaged across the same period. In all models, random effects for the intercept were estimated as variance components with standard deviations. As in Study 1, our primary interest was on effects for women, though models were tested to compare paths and indirect effects for men.

We also explored whether it was necessary and appropriate to model organizational-level effects in these analyses. Initial analyses revealed that there was a significant amount of between-company variation in cues to an identity-safe culture (perceived number of gender-inclusive policies: $\sigma^2 = 5.92$, $p < .05$; estimated percentage of female engineers: $\sigma^2 = 156.81$, $p < .05$), and when multiple data-points were from the same company, there was a high degree of company-level dependency in these cues (perceived number of gender-inclusive policies: $\rho = .56$, $p < .001$; estimated percentage of female engineers: $\rho = .78$, $p < .001$). These analyses confirm that cultural variability in the dataset exists on these perceptions of organizational cues and that there was high agreement between participants in how they view their organization. Thus, participants' self-reports of these cues do seem to track a shared view of the company.

However, these same analyses revealed no significant between-company or within-company dependencies for either the intercepts or the slopes of our outcome variables, suggesting that modeling company-level variation is unnecessary (Kreft & de Leeuw, 1998). More importantly, note that for 50% of the sample, only one person came from a particular company; for the other 50% of the sample, between two and 12 participants were recruited from the same company. Hox, Moerbeek, & Schoot (2017) and McNeish and Stapleton (2016) suggest that five to 10 participants per group (in this case, organization) is the minimum number to avoid convergence problems and inflated Type I error in multilevel models, and that these numbers need to be higher for complex models. Taken together, these analyses and review suggest that it was neither necessary nor appropriate to include an organizational

level in these models. Thus, analyses reported here focus on individual-level variability.

Descriptive analyses. As reported in Hall et al. (2015), women experienced more daily social identity threat ($M = 3.26$, 95% CI [2.90, 3.62]) than did their male colleagues ($M = 2.01$, 95% CI [1.69, 2.41]), $b = -1.25$, 95% CI [-1.31, $-.71$], $p < .001$, an effect that was still significant ($b = -1.01$, 95% CI [-1.57, $-.45$], $p < .001$) when controlling for both stigma consciousness (grand mean centered), which was a significant covariate ($b = .56$, 95% CI [.34, .79], $p < .001$), and relative status differences between conversation partners (group mean centered), which was not ($b = .19$, 95% CI [$-.06$, .45], $p = .142$).

The new data analyzed here concern participants' perceptions of identity safe cues in their organization. A preliminary set of t tests revealed no significant gender differences on the estimated percentage of female engineers, $t = -1.44$, $p = .152$, and the perceived number of gender-inclusive policies and norms at the companies where participants were employed, $t = 1.17$, $p = .244$. Thus, there is no evidence that gender was confounded with these cues to identity safety.

Do cues to identity safety predict lower daily social identity threat? To test our primary hypothesis, we used a multilevel model to assess the predictive effect of these cues to an identity-safe culture on women's and men's daily ratings of social identity threat. Our first model (Model 1a) included grand mean centered gender-inclusive policies, grand mean centered percentage of female engineers, participant gender (female = 0; male = 1), and all two-way as well as the three-way interaction terms entered as level 2 variables into a multilevel model predicting average daily social identity threat (measured at level 1).

Results from this model revealed that, along with a significant main effect of gender ($b = -1.21$, 95% CI [-1.75, -0.66], $Z = -4.36$, $p < .001$), there was a significant main effect of gender-inclusive policies such that men and women reported less social identity threat when they worked in a company that they perceived to have a high number of gender-inclusive policies, $b = -0.10$, 95% CI [-0.19, -0.01], $Z = -2.11$, $p = .035$, but there were no significant interactions between these variables ($ps > .10$). Unlike Study 1, where undergraduates were anticipating working for an imagined company, in this study of actual workplace experiences, employees' estimated female representation was not predictive of social identity threat. It also did not interact with any other variables in the models ($ps > .1$). To conserve degrees of freedom, the model was rerun to include gender representation only as a covariate. This adjusted model yielded a marginal interaction between participant gender and gender-inclusive polices, $b = 0.16$, 95% CI [-0.01 0.33], $Z = 1.83$, $p = .067$. Consistent with results in Study 1, women showed a significant relationship between gender-inclusive polices and identity threat, $b = -0.17$, 95% CI [-0.28, -0.05], $Z = -2.82$, $p = .005$, whereas men did not, $b = -0.01$, 95% CI [-0.14, 0.13], $Z = -0.11$, $p = .911$. Thus, it appears that the main effect of perceived presence of gender-inclusive policies on social identity threat might be largely driven by female participants.

Thus, in Study 2, working for a company that is perceived to have a high number of gender-inclusive policies predicted less social identity threat, an effect that tended to be stronger for women. In contrast, there was no clear evidence that women reported lower social identity threat as a function of working in an

engineering company in which they estimated a higher percentage of women. Thus, going forward, we focused subsequent analyses on gender-inclusive policies and controlled for gender representation.

Do cues to inclusion predict more accepting daily conversations? If it is indeed the case that the perceived presence of gender-inclusive policies creates a more positive workplace culture, does the presence of policies predict less social identity threat because workplace conversations signal greater acceptance and competence, especially for women interacting with men? To examine this question, we tested whether the perceived presence of gender-inclusive policies predicted the positivity of workplace conversations for women and/or for men, while controlling for employees' estimates of female representation. We also examined whether these effects differ depending on the gender of the conversation partner (which varied within-participants), given our earlier findings that women in this same sample are especially likely to experience social identity threat on days when they have negative conversations with their male, but not female, colleagues (Hall et al., 2015).

We first tested a model including grand mean centered percentage of female engineers included only as a covariate (level 2), grand mean centered gender-inclusive policies (level 2), participant gender (female = 0; male = 1; level 2), partner gender (level 1), and all two-way as well as the three-way interaction terms entered into a multilevel model predicting conversation positivity (measured at level 1).

This model revealed a significant two-way interaction between partner gender and inclusive policies, which was qualified by a significant three-way interaction between policies, participant gender, and partner gender, $b = -0.07$, 95% CI [-0.14, -0.01], $Z = -2.02$, $p = .044$ (see Table 1 for main effects and simple slopes from full model). Consistent with the experimental results of Study 1, simple slopes (see Figure 5) revealed that women who perceived their company as having a higher number of gender-inclusive policies also reported having more positive conversations with their male colleagues ($b = 0.10$, 95% CI [0.16, 0.05], $Z = 3.81$, $p < .001$), but not with their female colleagues ($b = 0.02$, 95% CI [0.08, -0.05], $Z = 0.52$, $p = 606$), where conversations were generally positive overall. This pattern of results shows that for women, conversations with male and female coworkers are reported as being equally positive in a company that they perceive to have a high number of gender-inclusive policies ($b = 0.03$, 95% CI [0.17, 0.23], $Z = 0.27$, $p = .787$). However, when women report working for a company that they perceive to have a low number of gender-inclusive policies, their conversations with other women are more positive than those with men ($b = -0.48$, 95% CI [-0.66, -0.31], $Z = -5.32$, $p = < .001$; policy*conversation partner gender interaction: $b = 0.09$, 95% CI [0.04, 0.13], $Z = 3.63$, $p < .001$).

Interestingly, men who reported working at a company that they perceived to have a high number of gender-inclusive policies also reported having better conversations with male colleagues ($b = 0.08$, 95% CI [0.14, 0.02], $Z = 2.65$, $p = .008$) and marginally better conversations with female colleagues ($b = 0.07$, 95% CI [0.14, -0.01], $Z = 1.79$, $p = .072$). That is, among men, gender-inclusive policies had a main effect relationship with conversations ($b = 0.07$, 95% CI [0.01, 0.14], $Z = 2.35$, $p = .019$) that did not interact with conversation partner gender ($b = -0.01$, 95% CI

Table 1

Summary of the Multilevel Model From Study 2 for Policies Predicting Conversation Ratings as Moderated by Participant Gender and Conversation Partner Gender and Controlling for Female Representation

Term	b	Z	p
Female representation	.00	.13	.897
Gender-inclusive policies	.08	4.14	<.001
Participant gender	−.02	−.29	.773
Partner gender	.10	4.01	<.001
Participant Gender × Gender Inclusive Policies	.05	1.04	.299
Participant Gender × Partner Gender	.09	.92	.357
Gender Inclusive Policies × Partner Gender	.09	3.63	<.001
Participant Gender × Gender Inclusive Policies × Partner Gender	−.07	−2.02	.044

[−0.03, 0.02], $Z = -0.51$, $p = .607$). Note that undergraduate men in Study 1 did not anticipate that workplace policies would foster more positive conversations.

Testing the indirect effect of gender inclusion on social identity threat via daily conversations. Finally, to test whether the positivity of women's workplace conversations with men (and not with women) is a mediator of the relationship between gender-inclusive policies and women's experience of social identity, we used a parametric bootstrap to establish a confidence interval around the indirect (i.e., mediated) effect of gender-inclusive policies on social identity threat through positivity of conversations with male colleagues. As in Study 1, we tested the indirect (i.e., mediated) effect separately for women and men while also testing the omnibus moderated mediation analysis. As in Study 1, paths a and c were modeled as moderated by gender, which enabled a single mediation model where we could test whether the indirect effect for female participants (path a^*b) was significantly different from the indirect effect for male participants. Initial analyses revealed no evidence that path b was moderated by gender. In summarizing the results below, we will describe the separate test of indirect effects for women and for men first followed by the test of moderated mediation.

This model revealed that for women there was a significant indirect effect ($ab = -0.20$, 95% CI [−.33, −.09], $Z = -3.38$, $p = <.001$; see Figure 6) such that the perceived presence of gender-inclusive policies related to having more accepting conversations with men (path a: $b = 0.11$, $Z = 3.74$, $p < .001$), which related to less social identity threat (path b: $b = -1.83$, $Z = -6.87$, $p = <. 001$). Note that a supplemental analysis testing reverse mediation (i.e., that organizational policies predict women's expectation of their interactions via reduced social identity threat) was nonsignificant, $ab = -.02$, $p = .104$.

For male participants, there was also a significant, albeit smaller, indirect effect ($ab = -0.12$, $Z = -2.08$, $p = .04$, 95% CI [−.25, −.02]). Among men, working for a company that they perceived to have more gender-inclusive policies predicted having more positive conversations with male colleagues (path a: $b = 0.08$, $Z = 2.55$, $p = .010$), which then related to lower social identity threat (path b: $b = -1.52$, $Z = -5.08$, $p < .001$).

It is important to keep in mind that although there is evidence of a significant indirect effect for men, there was no evidence of a direct relationship between gender-inclusive policies and social identity threat for male participants (path c: $b = .001$, $p = .910$). For women, however, the indirect effect through conversations with male colleagues fully mediated the relationship between gender-inclusive policies and social identity threat (path c: $b = -0.20$, $p < .001$, path c': $b = .03$, $p = .701$). The same omnibus test of moderated mediation as Study 1 was assessed, except here we could moderate path a by participant gender *and* conversation partner gender. As in Study 1, the test of moderated
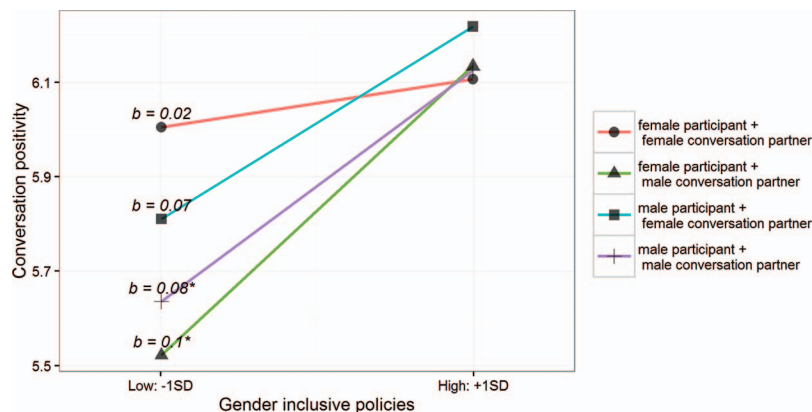

Figure 5. Simple slopes for gender-inclusive policies predicting daily conversation ratings by participant gender and partner gender in Study 2. See the online article for the color version of this figure.
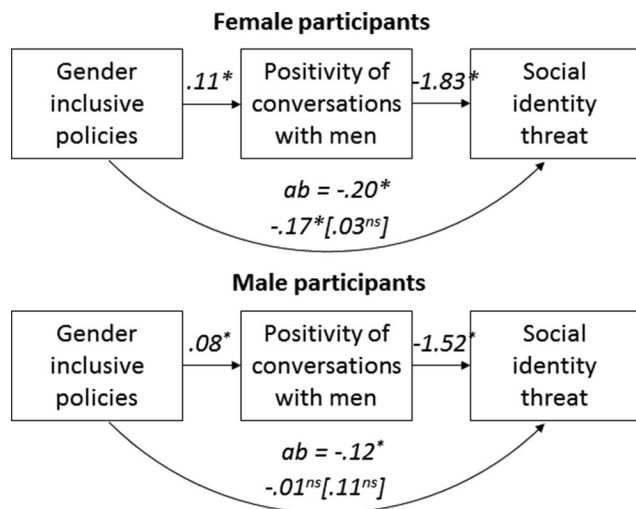
Female participants

Male participants

Figure 6. Path model for female and male participants in Study 2. All effects were estimated by fitting a path model in which paths *a* and *c* were moderated by gender to allow for simultaneous estimation of relationships for male and female participants. Female participants showed a significant indirect effect of policies on social identity threat through the anticipated positivity of their conversations with colleagues; for men, the same effect was also significant.

mediation was significant ($ab = -0.05$, 95% CI [-0.10, -0.01], $Z = 2.14$, $p = .033$).

Of note, an additional model estimating the positivity of conversations with women as a mediator revealed a total indirect effect that was nonsignificant for both male ($ab = -0.01$, 95% CI [-0.07, 0.03], $Z = -0.53$, $p = .597$) and female participants ($ab = .0002$, 95% CI [$-.06$, $.20$], $Z = .71$, $p = .475$).[5] Thus, the only conversational positivity with male colleagues was a significant mediator.

Assessing the role of third variables. Finally, as in Study 1, we also conducted a set of analyses exploring the possibility that individual differences in the general tendency to construe everything more positively or to be chronically aware of gender stigma could account for the relationships we find between reported gender-inclusive policies and our focal variables. These analyses (detailed in the online supplemental materials) revealed our focal effects to be robust to controlling for dispositional positivity and stigma consciousness.

Discussion

In Study 2, we found clear evidence among women that perceiving one's company to have more gender-inclusive policies relates to less social identity threat as mediated by having more accepting conversations with male (but with female) colleagues. Thus, building on the results of Study 1 where female STEM students anticipated they would experience less social identity threat working in a company with more gender-inclusive policies, results of Study 2 suggest that this expectation mirrors women's actual experiences working in STEM. This is the first evidence suggesting that gender-inclusive policies might be a valid cultural cue to identity safety, and is linked to women's feeling of acceptance and competence in interactions with men.

It is interesting to note that there was no evidence that the perceived percentage of women in one's company had similar effects. Furthermore, there was no evidence that accepting interactions with women also mediated the relationship between perceived policies and social identity threat. The lack of evidence for the estimated percentage of women in the organization as a cue to identity safety is particularly surprising, given past work suggesting that numeric representation can cue identity safety (Inzlicht & Ben-Zeev, 2000; Murphy et al., 2007). Thus, even though Study 1 suggests that women might expect to experience less social identity threat with more women in an organization, Study 2 suggests that for women in the workplace, the perception of having more women in the company might make little difference. However, we will again test for this effect in Study 3 before drawing conclusions.

Although our primary focus is on women's experiences, effects for men provide a useful comparison. Although there was no clear evidence that perceived gender-inclusive policies predicted less social identity threat for men, there was some indication of an indirect relationship of perceived gender-inclusive policies on men's awareness of their own gender through having more positive conversations with male colleagues. However, the moderated mediation also suggests that this indirect effect is significantly stronger for women than for men. Importantly, although it remains unclear whether or not men benefit from working for a company with gender-inclusive policies, there is certainly no evidence in these data that the perceived presence of these policies predicts men having more negative interactions or experiencing greater social identity threat at work. We will return to a discussion of effects for men later in the paper.

There were several limitations to Study 2 that Study 3 aimed to remedy using the same general methodology. First, although our causal model presumes that cues to identity safety predict women's experiences in the workplace, in Study 2 our measure of this predictor variable was collected after these outcomes. We chose this order because the original focus in Study 2 was on participants' daily experiences, and we were reluctant to make gender salient prior to collecting the daily diary data. However, in Study 3, we measured cues to identity safety prior to the daily diary measures to provide a cleaner test of our causal model. Second, Study 2 did not include a measure of more explicitly hostile or condescending conversations as we had included in Study 1. Thus, in Study 3, we also aimed to test the alternative hypothesis that a lack of hostility rather than the presence of acceptance mediates any relationships between cues to identity safety and social identity threat. Finally, recognizing that Study 2 was a fairly small sample for the models we wished to test, in Study 3 we aimed to double our sample size.

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[5] Although it is true that participants generally report having fewer conversations with women than with men, $t(95) = -14.95$, $p < .001$, analyses suggested that there was significant and similar levels of variability in average conversational positivity ratings for interactions with men ($\sigma = .63$, 95% CI [0.53, 0.74]) and with women ($\sigma = .50$, 95% CI [0.39, 0.62]). This speaks against the possibility that a restriction of range makes analyses with women as conversation partners uninterpretable.

Study 3

Overview

A new sample of professional engineers completed 10 daily diary surveys over the course of two work weeks, as well as two longer surveys at the start and end of the two-week period. As mentioned above, key changes included (a) measuring identity safe organizational cues in the first (rather than the last) long survey, (b) collecting a larger sample of working engineers to provide a better test and more reliable estimates of effects found in Study 2, and (c) measuring daily conversational hostility in addition to acceptance. We again tested our primary prediction that organizational cues to identity safety (especially the perceived presence of gender-inclusive policies given the results of the prior two studies) predict lower social identity threat for women in engineering, as mediated by having more accepting (and not less hostile) interactions with male colleagues.[6]

Method

Sample, recruitment, and procedure. In this study, pairs of male and female professional engineers were recruited by company representatives at participating engineering firms. Participants were eligible to complete the study if they indicated on an initial recruitment survey that they were trained as an engineer, spent most of their workday in a company office, and were employed full time (as in Study 2). As compensation, participants were allowed by their employer to complete the surveys during work hours (i.e., when their time is paid for by the company). Participants also received a $10 gift card if they completed the final survey. Recruitment continued until at least 100 male and 100 female engineers enrolled in the study. This target was established to balance attaining a sample size sufficient for data analysis against the constraints placed on data collection of this unique and difficult to recruit sample (i.e., the scarce supply of female engineers).

The final study had a sample of 268 engineers (147 female; 121 male). The attrition rate from the first to last survey was 18%, with men (22%) being marginally more likely to drop out than women (14%), $\chi^2 = 3.43$, $p = .06$. The 59 participants who did not complete measures beyond the first survey did not significantly differ from the 268 participants who completed all relevant survey data. For a complete list of measures, including those not analyzed for this study, see the online supplemental materials.

The final sample came from 28 different engineering companies across Canada, were mostly White (172 White, 41 Chinese, nine South Asian, seven Latin American, four Arab/Middle Eastern, four Filipino, two Japanese, two South Asian, one Black, one Korean, and 26 participants selecting two or more of these ethnicities), and the average age was 35.10 years old. Female participants ($M = 34.01$) were younger than male participants ($M = 36.35$), $b = 2.35$, $p = .042$.

Primary measures.

Cues to an identity-safe culture. In the first long survey, participants completed the same measure of *female representation* that was used in Study 2; the average score was 24.72%, with a range between 1% and 85%.

Participants also completed a revised measure of *gender-inclusive policies and practices* using a checklist in which they were asked to indicate whether a policy or practice was present at their organization. To make this measure more comprehensive and consistent with other work (Nishii, 2013), participants in Study 3 completed a 20-item checklist that was divided across five sub-sections, four of which were gender-inclusive categories: flexible work programs, work–life balance programs, recruitment retention and advancement in engineering, and promoting a gender-inclusive culture; a health and safety category of policies was also included as a filler set of items (see online supplemental material). The number of "Yes" responses across all of the gender-relevant subscales were summed to create a count of gender-inclusive policies and practices for each participant. Scores on this scale ranged from 2–15.

Initial analyses showed that the two organizational variables (estimated female representation and the perceived presence of gender-inclusive policies) were uncorrelated, $r = .07$, $p = .267$; however, closer examination of the data revealed that the lack of correlation was largely attributable to a single outlier (standardized residual = 3.44) who reported working in a company that had a high percentage of women (80%) but few gender-inclusive polices (two of 15); excluding this participant resulted in a positive correlation between the two organizational variables, $r = .13$, $p = .031$. Data from this participant were included in all subsequent analyses, and excluding their data does not change any of the conclusions reported.

Daily social identity threat. During the 10-day daily diary portion of the study, participants completed the same two item measure of social identity threat from Study 2 (rs ranged from .60–.84).

Daily conversations. As in Study 2, participants completed a modified Rochester Interaction Record for 10 workdays and made ratings of their three most significant conversations for each day. Two changes were made to these measures. First, to provide a shorter measure of positivity of conversations, participants made ratings using items designed to measure feelings of acceptance in Study 2 (friendly, respected, accepted, authentic, and relaxed, αs ranged from .84–.93). Second, a limitation of Study 2 was that it did not include a measure overt hostility. To address this limitation, we added two items that used semantic differentials to measure hostility: (1 = *polite*, 7 = *condescending*; and 1 = *argumentative*, 7 = *agreeable* (reverse scored)); rs ranged from .57–.79; see online supplemental material for the complete measure.

Participants completed an average of 7.69 daily surveys across the 10 days ($SD = 1.64$, range 3–10) and provided an average of 2.00 work conversations per day. There were significant gender differences such that men reported having more conversations with male colleagues, $p = .028$, and women reported having more conversations with female colleagues, $p = .001$, but no gender differences in the number of conversations about work. Both men and women reported having more work conversations with male ($M_{men} = 10.96$; $M_{women} = 9.63$) than with female colleagues ($M_{men} = 3.60$; $M_{women} = 4.74$). These patterns of responding were very similar to what was reported in Study 2 (i.e., Hall et al., 2015).

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[6] Analyses of other variables not related to key hypotheses of this paper are reported in two working papers (see Block, Hall, Schmader, Croft, & Innes, in press; Hall, Schmader, Aday, & Croft, in press).

Demographic variables. The same demographic variables measured in Study 2 were also assessed in Study 3: participants' age, ethnicity, level of education, number of prior career positions, personal salary, gross salary, number of children, marital status, and job status (see online supplemental materials for analyses of gender differences on these variables).

Results

Analytic strategy. In Study 3, we used the same analytic strategy as in Study 2: first testing for gender differences in daily social identity threat and then testing whether cultural cues to identity safety predict women's experience of social identity threat as mediated by conversational variables. Although our interest is in understanding between-person variation, all focal models were estimated using multilevel modeling given that the conversation variables and social identity threat were measured at the daily level and partner gender during conversations varies within person.

As in Study 2, we did not have a sufficient number of employees working within the same company to model organizational-level variability (Hox, Moerbeek, & Schoot, 2017; McNeish & Stapleton, 2016). For example, 82% of the companies in the dataset provided fewer than 10 participants. Furthermore, an analysis of company level variability in the outcome variables suggested that there were no significant organization-level dependencies in conversations or social identity threat. Thus, again, it was neither necessary nor appropriate to model organization-level variability in these analyses. However, as in Study 2, there was a significant amount of between-company variation in cues to an identity-safe culture (employee reports of gender-inclusive policies: $\sigma^2 = 2.08$, $p < .05$; and percentage of female engineers: $\sigma^2 = 74.46$, $p < .05$) and a high degree of company-level dependency in these cues (number of gender-inclusive policies: $\rho = .47$, $p < .001$; percentage of female engineers: $\rho = .41$, $p < .001$). Thus, for those men and women who did work for the same company, there was substantial agreement in their ratings of these cues, suggesting that the measures track some degree of real environmental variation.[7]

Descriptive data. We first present descriptive information about gender differences on variables (see Table 2). Replicating findings from Hall et al. (2015), women reported experiencing more daily social identity threat than did their male colleagues.[8]

As can be seen in Table 2, men and women did not differ in their overall ratings of acceptance or hostility in interactions with either male or female colleagues. Additional analyses revealed that both male and female participants reported conversations with male colleagues to be both less accepting and more hostile than their conversations with female colleagues, *p*s <.001. Perhaps what is most striking is that ratings of conversation hostility were very low overall ($M = 1.81$, $SD = 1.11$, on a scale ranging from 1 = *argumentative/condescending* to 7 = *agreeable/polite*). In fact, of the 3778 conversations reported by participants, only 4% were rated as being below the midpoint, on the negative side the scale. Thus, most of the variability on this measure assesses varying levels of rating the interaction as polite and agreeable.

Turning to the organizational cues, we first tested whether there were gender differences on the organizational variables of interest. Unlike in Study 2, men in this study reported marginally higher estimates for female representation than did women, and significantly higher counts for the number of gender-inclusive

policies than did women (see Table 2). The gender differences on these variables were significant when controlling for stigma-consciousness (female representation: $t(260) = 2,07$, $p = .040$; gender-inclusive policies: $t(260) = 1.96$, $p = .051$). Because of this difference, we will need to be mindful of whether women underestimate or men overestimate the gender inclusivity of their company. Direct comparisons of employee reports to HR reports suggest that the latter might be more likely (details available from first author).

Do cues to inclusion predict lower daily social identity threat? We tested our primary hypothesis that cultural cues to identity safety predict women's daily experience of social identity threat by fitting a multilevel model in which we considered participant gender (female = 0; male = 1), female representation, gender-inclusive policies (all at level 2), and the two-way and three-way interactions as predictors of social identity threat (at level 1). As in Studies 1 and 2, when higher order interactions were not significant, models were rerun to estimate lower order effects and conserve statistical power. These analyses revealed a main effect of gender-inclusive policies ($b = -0.10$, 95% CI [-0.15, -0.04], $Z = -3.48$, $p < .001$). As in Study 2, the main effect of female representation was not significant ($b = 0.00$, 95% CI [-0.01, 0.02], $Z = 0.67$, $p = .500$). There were no significant interactions of either variable with gender ($p > .25$). Because our primary hypotheses focus on women's experience and because the prior two studies had found stronger effects of gender-inclusive policies among women than men, we also conducted more focal analyses by gender, while controlling for female representation. As in Studies 1 and 2, the perceived presence of gender-inclusive policies was significantly related to lower social identity threat for women ($b = -0.09$, 95% CI [-0.16, -0.02], $Z = -2.57$, $p = .010$). In this study, however, gender-inclusive policies also predicted lower social identity threat for men ($b = -0.11$, 95% CI [-0.20, -0.02], $Z = -2.43$, $p = .015$).

Do cues to inclusion predict more accepting daily conversations? In Study 3, we used the same analytic strategy as Study 2 to test whether women experienced more accepting and less hostile interactions when they perceived that they worked for a company with a higher number of gender-inclusive policies. Results below focus on the perceived presence of gender-inclusive policies as a predictor (with female representation included only as a covariate) given that initial analyses above revealed no significant relationship between estimated female representation and identity threat. We first tested a model in which we considered participant gender, conversation partner gender, gender-inclusive

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[7] For about two thirds of participants, we also had gender representation and inclusive policy ratings from a human resources officer at their company. HR reports of gender-inclusive policies were significantly correlated with employees' reports ($r = .56$, p = .007), suggesting that the participants' policy ratings have some objective validity. HR reports of gender representation, however, did not correlate with employee ratings ($r = .003$, p = .98). But keep in mind that HR officers might be reporting on overall demographic characteristics of a large multinational company, whereas employees might be estimating that ratio for their specific workplace location.

[8] Four participants (two male, two female) were identified as outliers (>2.5 standardized residuals) on the social identity threat measure; excluding their data did not change the reported analyses, but their data were retained in all subsequent analyses.

Table 2

Gender Differences in Means (and Standard Deviations) for Focal Variables in Study 3

Variable	Female	Male	Statistic[a]	p
Social identity threat	2.78 (1.55)	2.59 (1.34)	3.20	.002
Acceptance during conversations with men	6.09 (1.04)	6.13 (.99)	.41	.681
Acceptance during conversations with women	6.22 (.96)	6.29 (.82)	.70	.484
Hostility during conversations with men	1.87 (1.18)	1.86 (1.11)	−.11	.912
Hostility during conversations with women	1.67 (1.00)	1.68 (.93)	.06	.952
Female representation	23.44 (12.40)	26.29 (11.46)	1.92	.057
Gender-inclusive policies	9.18 (2.72)	10.18 (2.34)	3.19	.002

[a] The reported statistic is a Z statistic for all measures except female representation and gender-inclusive policies, where it is instead a t-test.

policies, and all of the two- and three-way interactions as predictors of feelings of acceptance during work conversations, and controlling for female representation. We repeated this analysis for hostility. Results of these models are reported in Table 3.

Conversational acceptance. Analyses of conversational acceptance revealed a significant main effect of gender-inclusive policies on conversational acceptance, $b = 0.05$, 95% CI [0.01, 0.09], $Z = 2.60$, $p = .009$, and no significant two-way or three-way interactions. Participants generally reported having more accepting conversations with their colleagues in a company that they perceived to have a high number of gender-inclusive policies. To provide a clearer test of our hypotheses for women, we conducted a focused examination of the simple slopes by gender. Among women, the perceived presence of gender-inclusive policies significantly predicted greater acceptance both in conversations with men ($b = 0.06$, 95% CI [0.02, 0.11], $Z = 2.66$, $p = .008$) and with women ($b = 0.06$, 95% CI [0.01, 0.11], $Z = 2.27$, $p = .023$). Among men, these specific relationships were not statistically significant (conversations with men: $b = 0.03$, 95% CI [−0.03, 0.08], $Z = 0.85$, $p = .394$; conversations with women: $b = 0.02$, 95% CI [−0.04, 0.08], $Z = 0.62$, $p = .534$).

Conversational hostility. The same analysis predicting conversational hostility yielded quite similar patterns. A main effect of gender-inclusive policies in the absence of any significant interactions suggested that participants reported having somewhat less hostile conversations in companies that they perceived to have a high number of gender-inclusive policies, $b = −0.04$, 95% CI [−0.07, 0.01], $Z = −2.24$, $p = .025$. A more focused test revealed

this relationship between gender-inclusive policies and hostility to be significant for female participants when talking with male colleagues, $b = −.05$, 95% CI [−0.09, −0.01], $Z = −2.25$, $p = .024$, but the same relationship was not significant for female participants when talking with female colleagues ($b = −.04$, 95% CI [−.09, .01], $Z = −1.51$, $p = .131$), male participants talking with male colleagues ($b = −.02$, 95% CI [−.08, .01], $Z = −0.67$, $p = .501$), or male participants talking with female colleagues ($b = −.03$, 95% CI [−.09, .04], $Z = −0.87$, $p = .384$).

Testing mediation of effect on social identity threat by daily conversations. As in the prior studies, our core interest was in testing the indirect effect of gender-inclusive policies on women's experience of social identity threat as mediated by the degree to which they feel accepted by their male colleagues during daily interactions. Using the same analytic approach in Study 2, we conducted a path analysis in multilevel modeling in which paths a and c were tested as being moderated by gender. Again, this approach provided a clear test of our primary a priori hypotheses for women, while providing a simultaneous test for men and the omnibus moderated mediation. As in the prior studies, we describe the separate test of indirect effects for women and for men first followed by the test of moderated mediation. Female representation is included as a covariate.

Testing conversational acceptance as a mediator. Analyses of these different models revealed a pattern of results consistent with Studies 1 and 2. As hypothesized, there was a significant indirect effect among women ($ab = −0.08$, 95% CI [−0.15, −0.02], $Z = −2.46$, $p = .010$; see Figure 7) such that the

Table 3

Summary of the Multilevel Models From Study 3 for Policies Predicting Conversation Ratings (Acceptance and Hostility as Separate Models) as Moderated by Participant Gender and Conversation Partner Gender and Controlling for Female Representation

Term	Feelings of acceptance			Feelings of hostility		
	b	Z	p	b	Z	p
Female representation	.00	.78	.437	.00	.13	.899
Participant gender	.00	.05	.961	−.01	−.24	.813
Gender-inclusive policies	.05	2.60	.009	−.04	−2.24	.025
Partner gender	.07	5.11	<.001	−.10	−5.35	<.001
Participant Gender × Gender Inclusive Policies	−.04	−.96	.339	.01	.31	.757
Participant Gender × Partner Gender	−.04	−.74	.457	−.01	−.19	.848
Gender Inclusive Policies × Partner Gender	.00	.13	.899	−.01	−.46	.642
Participant Gender × Gender Inclusive Policies × Partner Gender	.00	.16	.876	.02	.59	.557

Female participants
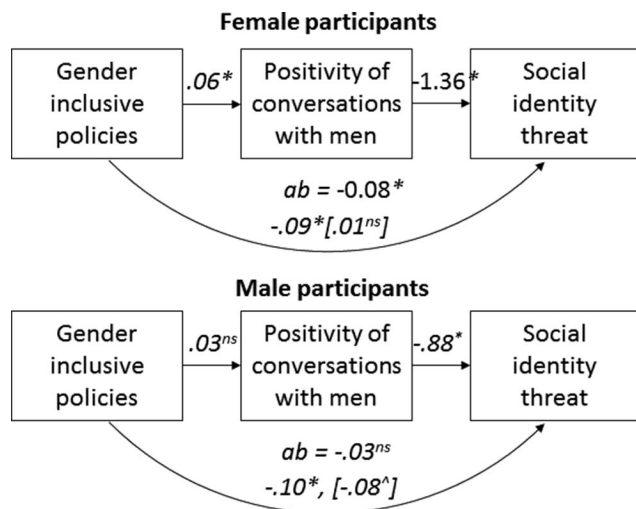

Male participants

Figure 7. Path model for female and male participants in Study 3. All effects were estimated by fitting a path model in which paths *a* and *c* were moderated by gender to allow for simultaneous estimation of relationships for male and female participants. Female participants showed a significant indirect effect of policies on social identity threat through the anticipated positivity of their conversations with colleagues; for men, the same effect was not significant.

perceived presence of gender-inclusive policies predicted having more accepting conversations with men (path *a*: $b = 0.06$, $Z = 2.48$, $p = .010$), which then predicted less social identity threat for women (path *b*: $b = -1.36$, $Z = -12.18$, $p = < .001$). As in Studies 1 and 2, a supplemental analysis testing reverse mediation (i.e., that organizational policies predict women's expectation of their interactions via reduced social identity threat) was again nonsignificant, $ab = .002$, $p = .848$.

In analyses of male participants, the indirect effect of policies on social identity threat via accepting conversations with men was not significant ($ab = -0.03$, 95% CI [-0.08, 0.03], $Z = -0.96$ $p = .337$). Men showed a nonsignificant relationship between gender-inclusive policies and feeling accepted during conversations with their male colleagues (path *a*: $b = .03$, $Z = .92$, $p = .360$), although acceptance did relate to lower social identity threat (path *b*: $b = -0.88$, $Z = -8.26$, $p < .001$).

Similarly, among women, the direct effect gender-inclusive policies on social identity threat was largely mediated by feelings of acceptance during conversations with male colleagues (path *c*: $b = -.09$, $p = .010$, path *c*': $b = .01$, $p = .670$); but for men, there was evidence of only a marginal reduction in the direct effect (path *c*: $b = -.10$, $p = .020$, path *c*': $b = -.08$, $p = .060$). Finally, the omnibus test of moderated mediation assessed in Study 2 was also tested in Study 3. Unlike previous studies, the omnibus test of moderated mediation was not significant in this study ($ab = 0$, 95% CI [-0.03, 0.04], $Z = 0.16$, $p = .876$). This was likely driven by the fact that gender did not moderate the relationship between gender-inclusive policies and positivity of conversations in this study. Thus, although patterns for women replicated across all three studies, there was more inconsistency in patterns of effects for men.

Testing alternative mediators. We tested whether accepting conversations with other female colleagues or hostile conversa-

tions with either male or female colleagues might also mediate effects. Importantly, when these path analyses were repeated with each of the alternative mediators tested, all indirect effects were nonsignificant. Thus, there was no evidence among women or men that the relationship between gender-inclusive policies and social identity threat was accounted for by having accepting conversations with female colleagues[9] (female participants: $ab = -0.01$, 95% CI [-0.04, 0], $Z = -1.46$, $p = .144$; male participants: $ab = 0$, 95% CI [-0.01, 0.01], $Z = -0.01$, $p = .994$), having hostile conversations with male colleagues (female participants: $ab = -0.05$, 95% CI [-0.12, $.01$], $Z = -1.64$, $p = .101$; male participants: $ab = -.02$, 95% CI [-0.08, 0.04], $Z = -0.63$, $p = .526$), or by having hostile conversations with female colleagues (female participants: $ab = -0.02$, 95% CI [-0.06, $.01$], $Z = 1.17$, $p = .243$; male participants: $ab = -.01$, 95% CI [-0.04, 0.01], $Z = -0.88$, $p = .378$).

Assessing the role of third variables. Finally, as in the prior study, we assessed the role of potential third variables (i.e., stigma consciousness and dispositional positivity) in our analyses (see SOM for details). Key results were robust to controlling for dispositional positivity; however, in this study we could not completely rule out the role of stigma consciousness in explaining the link between inclusive policies and women's social identity threat. We return to this issue in the internal meta-analysis described in the next section.

Discussion

Overall, these analyses provide support for our core hypothesis that women working in engineering firms with greater number of gender-inclusive policies experience less social identity threat, in part because they feel more accepted by their male colleagues.[10] This relationship between policies and social identity threat was not also mediated by having accepting conversations with other women or by having overtly hostile conversations with men. As in Study 2, estimated female representation within the organization did not predict women's experience of social identity threat, once again highlighting a discrepancy between anticipated (Study 1) and actual (Studies 2 and 3) cultural cues to identity safety. It is notable that these effects for women largely replicated despite the change of ordering of our measures between Study 2 and 3 and adjustments we made to our measure of gender-inclusive policies. It is also notable that convergence between participants' ratings and HR ratings of organizational policies (on a subsample of data) suggests that participants are reporting on some objective aspects of their organization. Interestingly, although men in this study also showed positive relationships between gender-inclusive policies, accepting conversations with male colleagues, and lower social

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[9] Like in in Study 2, participants generally report having fewer conversations with women than with men, $t(266) = -18.63$ $p < .001$; analyses suggested that there were significant and similar levels of variability in average conversational positivity ratings for interactions with men ($\sigma = .74$, 95% CI [0.67, 0.81]) and with women ($\sigma = .64$, 95% CI [0.56, 0.72]). Again, this speaks against the possibility that a restriction of range makes analyses with women as conversation partners uninterpretable.

[10] Note that in additional analyses, there was no evidence that a non-gender relevant set of policies (i.e., health and safety policies) similarly predicted women's feeling of acceptance in conversations with men ($b = .02$, $Z = 0.33$, $p = .743$) or daily reports of social identity threat ($b = -.05$, $Z = -0.50$, $p = .619$).

identity threat, evidence for a mediated relationship was less clear for men. Although the nonsignificant tests of moderated mediation in Study 3 prevents us from making any strong conclusions about these variables relating in different ways for men and women in this study, the subsequent internal meta-analysis will provide better power for assessing these gender differences.

Meta-Analyzed Results

Because these three studies each tested the same conceptual model, we also provide an internal meta-analysis of our effects across studies (Goh, Hall, & Rosenthal, 2016). This approach allowed us to yield better estimates of effect sizes among our key variables, especially for effects that did not yield consistent patterns of significance (Lakens & Etz, 2017). Specifically, we computed an average effect size for the relationship that gender-inclusive policies had with participant reports of social identity threat and the positivity of conversations with their male colleagues. We estimated these separately for women ($n = 344$) and men ($n = 266$). Effects sizes were computed as correlation coefficients using the methods described by Edwards and colleagues (2008) and are summarized in Table 4.

For women, there was a significant overall relationship between gender-inclusive policies and social identity threat, $r = -.20$, $p < .001$, that was also significant in each individual study. Women also showed a significant relationship between gender-inclusive policies and the positivity of conversations with their male colleagues, $r = .22$, $p < .001$, that again was significant in each individual study. Furthermore, overall these relationships were robust to controlling for stigma consciousness and dispositional positivity (see supplementary online materials for more detail). Thus, there was no clear evidence that these relationships observed were the result of a more general dispositional tendency to see one's organization, one's interactions, and oneself all in either a positive or gender-biased light.

In contrast to the consistency of effects for women in each study and overall, the same relationships for men were more variable across studies. Thus, the internal meta-analysis might allow us to better isolate the true effect for men with the available data from

these studies. When effects for men were examined meta-analytically, neither the overall relationship between gender-inclusive policies and social identity threat, $r = -.07$, $p = .292$, nor between gender-inclusive policies and feelings of acceptance in conversations with other male colleagues, $r = .12$, $p = .054$, were significant.

In two of three studies (Studies 1 and 2, but not 3), the overall test of moderated mediation was significant when testing feelings of acceptance as a mediator of the relationship between gender-inclusive policies and social identity threat. To establish significance of the test of moderated mediation across the three studies, we meta-analytically estimated the overall moderated indirect effect. A p value for the moderated indirect effect was then established using the partial posterior method (Falk & Biesanz, 2016). This analysis revealed that the meta-analytic moderated indirect effect for the test of moderated mediation was significant, $b = .06$ $p = .034$. This means that, when estimated meta-analytically, the overall indirect effect for female participants was statistically different from the overall indirect effect for male participants. Thus, the overall results suggest that inclusive policies have a significantly stronger effect on women's (as compared with men's) experience and expectation of social identity threat as mediated by positive and accepting conversations with male colleagues.

Finally, we tested a reverse mediation model to assess the alternative possibility that organizational policies predict women's daily experience of social identity threat in ways that then predict how they perceive their interactions with men. As already described, we tested this reverse mediation model in each individual study (just among women) and found the indirect effects to be nonsignificant. When estimated meta-analytically using the same approach described previously, these analyses revealed that the indirect effect assessing women's perception of inclusive policies predicting positive conversations with men via daily social identity threat was again nonsignifcant ($ab = -.01$, $p = .338$). Thus, there is no evidence to support a causal model whereby women's anticipated or experienced social identity threat is what drives the way they perceive their interactions with male colleagues.

Table 4
Summary of Women's and Men's Meta-Analytic Effects (as Correlation Coefficients) for Each Path in the Tested Model Both Overall and for Each Individual Study

Effect	Study	Female participants	Male participants
Policies predicting feelings of acceptance in conversations with men	Overall	.22*** [.20***]	.12# [.11]
Study 1		.17** [.17**]	.04 [.04]
Study 2		.34*** [.33***]	.27** [.27**]
Study 3		.16** [.10]	.05 [.02]
Policies predicting social identity threat	Overall	−.20*** [−.14**]	−.07 [−.05]
Study 1		−.14* [−.14*]	−.04 [−.04]
Study 2		−.29** [−.21*]	−.01 [−.01]
Study 3		−.16** [−.08]	−.14* [−.10]
Feelings of acceptance in conversations with men predicting social identity threat	Overall	−.34*** [−.28***]	−.24*** [−.22***]
Study 1		−.27*** [−.19**]	−.22*** [−.24***]
Study 2		−.27* [−.28**]	−.22* [−.20#]
Study 3		−.48*** [−.38***]	−.29*** [−.23***]

Note. In Study 1, the accepting conversation variable did not specify the gender of the partner. Numbers in square brackets are correlation coefficients estimated while controlling for stigma consciousness.
# $p < .06$.   * $p < .05$.   ** $p < .01$.   *** $p < .001$.

Taken together, these patterns of results are consistent with our initial hypotheses that organizational cues to an identity-safe culture, particularly the perceived presence of gender-inclusive policies within one's organization, relate to lower levels of social identity threat for women in (or anticipating going into) engineering, because they predict more accepting conversations with male colleagues.

General Discussion

The findings across these studies reveal novel evidence that women's experience of social identity in STEM organizations is predicted by the degree to which they feel accepted by their male colleagues and perceive the presence of gender-inclusive policies in their organization. Based on past theory and research, we examined two possible contextual cues to identity safety: the perceived presence of inclusive gender policies and higher female representation, either of which could alone or in combination signal or create a fairer and identity-safe workplace culture (Inzlicht & Ben-Zeev, 2000; Purdie-Vaughns et al., 2008). The results of these studies suggest that the perceived existence of gender-inclusive organizational policies was the stronger predictor of reduced social identity threat, both actual and anticipated, among female participants in engineering. This cue to an identity-safe workplace culture not only directly related to fewer concerns of gender-based evaluation among women, but related to these lessened concerns by indirectly predicting more accepting interactions between men and women.

Although in Study 1, women anticipating going into engineering expected both gender-inclusive policies and the representation of women to be important for reducing their identity threat, our research among women working in engineering revealed no clear or consistent evidence that their perception of female representation actually related to their daily experiences of social identity threat. Thus, these findings are notable as the first evidence to prioritize the perceived presence of gender-inclusive policies, over the percentage of women in the setting, as predictive of lower social identity threat among women in STEM. These findings show some symmetry to past research on racial diversity. In prior experimental research, Purdie-Vaughns and colleagues (2008) found that Black professionals distrust a company if they proclaim a colorblind approach and do not employ a diverse workplace. However, a stated value for diversity overcame this distrust, even when the company roster was not diverse, and Blacks were relatively less worried about being judged based on their race in this condition. Together, these findings of past and present research might suggest that even when very few women or minorities are present in a company, an identity safe environment might still be fostered by establishing and promoting inclusive workplace policies.

Of course, the lack of a clear effect for gender representation predicting lower social identity threat among women seems at odds with some past research (e.g., Inzlicht & Ben-Zeev, 2000) and the results of Study 1. It might be an interesting finding in and of itself that women *expect* that having more women represented in their workplace will create a more identity safe environment, when in fact day-to-day interactions with men and the cultural values and policies of the company matter more. After all, people often have difficult accurately forecasting their reactions to situations (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998). We might also speculate, however, that in the absence of other direct information about culture, the presence of other women or minorities is used to make inferences about the culture of an organization or environment (much like demographic information leads us to stereotype individuals in thin slice impression formation, Kunda, Davies, Adams, & Spencer, 2002). But when explicit information about organizational policies, practices, and values is available and/or one has personal interaction with others, these cues are simply more powerful and predictive indicators of institutional culture than mere demographic features. Future research might follow up on these interesting ideas by studying the time course for learning about a new organizational culture via thin and thick slices of information.

The research reported here also sheds light on a likely mechanism by which inclusive policies might reduce women's experience of social identity. Across all three studies, the relationship between the perceived presence of gender-inclusive policies and women's experiences (or expectations) of social identity threat was statistically mediated by women having (or expecting to have) more positive workplace conversations with men. Evidence for mediation among women was found both when female engineering students were anticipating working in an engineering firm and among those employed as working engineers. Furthermore, because conversations with women did not also mediate this relationship, it does not seem to be the case that gender-inclusive policies simply foster a more communal workplace in general. Some have argued that engineering has a uniquely masculinized and competitive culture that alienates many women (Williams & Dempsey, 2014; Fouad & Singh, 2011). The presence of these gender-inclusive policies might generally signal a less competitive context that particularly fosters more accepting behavior and styles of interaction among men. Finally, it is notable that in Studies 1 and 3, we found stronger evidence that the presence of feeling accepted, and not the absence of overt hostility, mediated these effects. In fact, our conversational sampling technique captured very few truly hostile interactions among working engineers. It is not, therefore, merely the case that these relationships stem from the way in which policies directly prohibit explicit forms of mistreatment.

Although our primary hypotheses concerned women's experiences, we tested competing hypotheses for effects among men whereby the presence of identity safe norms and policies could either predict positive, negative, or have a neutral effect on men's interactions and experiences. Perhaps because men could have more complex reactions to gender-inclusive policies, we did not find evidence for a clear advantageous or disadvantageous impact of these cues on men's interactions and experiences. Across individual studies, the clearest effect for men was that having more positive conversations with their male colleagues generally predicted having lower concerns with how they were evaluated based on their gender. But the presence of gender-inclusive policies sometimes predicted more accepting man-to-man conversations (Study 2) and sometimes predicted lower social identity threat for men (Study 3). Neither of these effects were anticipated by men (Study 1). Given that data science scholars have recently noted that it is not uncommon to find inconsistent patterns of significance across multiple studies (Lakens & Etz, 2017; Schimmack, 2012), we conducted an internal meta-analysis to provide the most accu-

rate estimate of our effects for men as compared with women. These analyses do suggest that the consistent indirect effect for women (whereby inclusive policies predict lower social identity threat via acceptance from men) is significantly stronger than that for men. Thus, the beneficial effects isolated here are more apparent for women.

Importantly, although we cannot conclude that gender-inclusive policies are as beneficial for men's experiences in engineering as they are for women's, there is no evidence in these studies that they are (or are anticipated to be) harmful. This alone is important to document because members of the majority groups can often be resistant to policy changes that they see as benefiting only a minority of employees (Thomas & Plaut, 2008). For example, organizational mission statements that broadly advocate for diversity are prone to eliciting negative reactance, as they tend to incite a sense of exclusion among the majority (Plaut, Garnett, Buffardi, & Sanchez-Burks, 2011). Yet diversity initiatives that actively seek to include members of the majority group foster engagement and yield benefits for members of both the minority and the majority (Gündemir, Homan, Usova, & Galinsky, 2017; Stevens, Plaut, & Sanchez-Burks, 2008). In addition to establishing the most effective framing of these diversity messages, additional work that documents the broader cultural and personal correlates of negative reactance to diversity initiatives might be effective in lowering this resistance.

Limitations and Future Directions

These studies make many novel practical, methodological, and theoretical advances to the literature on social identity threat. However, it is important to note several limitations to the conclusions that can be drawn from these data. First, although the daily diary method provides greater ecological validity to these studies, the data in Studies 2 and 3 are still correlational and therefore it is difficult to assess directionality of the results in those studies. We interpret our findings in light of a causal model where inclusive policies foster more positive workplace interactions with men which then reduce social identity threat. We note that a fairly similar patterns of results was found for women, regardless of the different ordering of these variables across Studies 2 and 3. Study 1, which experimentally manipulated these cues, provides added support for this causal model. In addition, reverse mediation analyses reveal no evidence that perceived gender-inclusive policies encourage women to report having more positive interactions with their colleagues because they experience reduced social identity threat.

We also took several steps to test and rule out more general responses biases as alternative explanations for our effects. Across the studies, effects were robust to controlling for individual differences that would indicate a positive personality style or low stigma consciousness. Effects are also specific to gender-inclusive policies and mediated specifically by women's ratings of their conversations with male (and not female) colleagues. The positive predictive effects of policies were also unique to gender-inclusive policies and did not replicate with our measure of health and safety policies. In the same way that carefully constructed control conditions rule out alternative explanations in experimental designs, this profile of convergent and divergent effects allows us to rule out several plausible third variable explanations.

Nevertheless, it is possible that in the latter two studies, less competitive, domineering, or sexist men are attracted to, and thus self-select, into companies that have more gender-inclusive policies (or at least into studies such as ours). Supplementary analyses not reported here provide no evidence that men who reported belonging to a more gender-inclusive company were lower in ambivalent sexism (Study 2) or implicit bias (Study 3), speaking against this alternative interpretation. However, one must keep in mind that the men in the study sample are typically not the same men with whom women are conversing, thus limiting any ability to use these data to conclusively rule out this alternative possibility. Ideally, future research could conduct prospective studies that assess changes in cross-sex interactions and experiences of social identity threat after gender-inclusive policies are implemented. Such longitudinal designs might also test the interesting possibility that if interactions between men and women become more accepting, that gender-inclusive policies become more readily supported and enacted. In other words, just as broader contextual cues to culture can affect how people interact with one another, the relationships among people might be able to change the broader culture.

A second limitation is that our measure of cues to identity safety relied on participants' own reports. We recognize that such reports might themselves be subject to biases, but it is important to note that in both Studies 2 and 3, participants who worked for the same company did show significant convergence in their ratings of these cues. Furthermore, we would be incorrect to assume that perceptions of environmental characteristics are not meaningful predictors of experience. Just as stress researchers find evidence that perceived stress and perceived social support predict unique variance in health outcomes over and above objective stressful life events (Cohen, Kamarck, & Mermelstein, 1983; Wethington & Kessler, 1986), participants' perceptions of these cues to inclusion might also understandably be most predictive of people's interactions and experiences. Indeed, in Study 3, we were able to collect parallel data from human resource (HR) professionals on a subsample of participants. These HR ratings of female representation and gender-inclusive norms and policies (which might be subject to their own procompany biases) were not predictive of women's experiences of social identity threat, over and above women's ratings of these cues (see the online supplemental materials for more detail). Admittedly, more objective data on policies and female representation in the organizations would provide clearer information to companies themselves on whether their actual policies help to foster benefits for women. It is possible, for example, that in addition to merely enacting such policies, companies also need to educate employees about their existence and their benefits. Indeed, intervention studies could test whether educating employees about the existence of gender-inclusive policies already in place might positively benefit the interpersonal workplace culture over time, and consequently reduce the rates at which women leave the profession.

Finally, we were unable to determine whether the effects of institutional signals of identity safety were driven by men's behavior during the conversations, women's interpretations, or some dynamic combination of both. For women, the perception of a workplace as inclusive might shape their subjective experience of workplace interactions by guiding their construal, attention, and behavior (Klein & Kunda, 1992), and in doing so buffer them

against social identity threat by making their interactions seem more accepting. For men, working in what they believe to be a gender-inclusive workplace might motivate them to avoid gender biases and be better allies to women (Devine, Forscher, Austin, & Cox, 2012; Kalinoski et al., 2013; Klonis, Plant, & Devine, 2005; Plant & Devine, 2009). Future work could employ observational techniques to measure behavior more objectively. For example, in a lab paradigm, conversations could be video recorded and coded for behavioral and verbal cues of acceptance (e.g., increased eye contact, head nodding, reduced physical distance; Goff, Steele, & Davies, 2008; Vorauer & Turpie, 2004).

Conclusions

Women leave STEM settings at a higher rate than do men (Hunt, 2010). Social identity threat is one potential explanation for the uniquely adverse experience that some women face in STEM. This work offers insight into possible points of intervention: Gender-inclusive policies and accepting workplace relationships might be an important means of fostering a more accepting interpersonal environment in which people feel mutually respected and free from concerns about gender stereotyping. The biggest practical implication of these findings is the demonstration that gender-inclusive policies might benefit women, not only by predicting lower levels of social identity threat but also by promoting feelings of acceptance in interactions. Such evidence provides value to companies when establishing new policies not only for suggesting the benefits that such policies might have, but also in advertising those benefits to employees. It is our hope that this research will inform workplace policy designed to foster inclusive interpersonal interactions that create identity-safe environments for employees. By creating a culture of inclusivity, we believe we can recover human potential that would otherwise by lost under the weight of identity threat.

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