



Case Report

Gender stereotypes and intellectual performance: Stigma consciousness as a buffer against stereotype validation

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ABSTRACT

Previous research has found that activating self-relevant, negative stereotypes after a task may increase people's certainty about their own poor performance (i.e., stereotype validation). The current research examined how individual differences in stigma consciousness may moderate these effects. Building from past findings, we hypothesized that high stigma consciousness in women would be associated with lower susceptibility to gender stereotype validation—due to heightened motivation to avoid, reject, and/or react against perceived bias. In two studies, participants completed a difficult test on the subject of business economics. When the gender stereotype about business ability was made salient afterward, no evidence of stereotype validation emerged among women high in stigma consciousness. However, for women with lower stigma consciousness, the data suggest that stereotype activation validated negative views of their own performance and, in turn, had an adverse effect on related attitudes and beliefs about their abilities.

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Questions regarding how group stereotypes may gain influence in performance settings are some of the most widely studied in social psychology. While much of this inquiry has been focused on how negative stereotypes can undermine subsequent performance (i.e., stereotype threat; see Steele, Spencer, & Aronson, 2002), recent research suggests that stereotype activation that occurs only *after* performance may also hold pernicious consequences. Clark, Thiem, Barden, Stuart, and Evans (2015) found evidence that post-performance activation of negative stereotypes may serve to strengthen or validate a person's evaluation of their performance. Across a series of studies, participants were more certain they had performed poorly on a difficult test when self-relevant, negative stereotypes were made salient afterward compared to when they were not (i.e., stereotype validation). In turn, these validating effects of stereotypes were found to hold downstream consequences wherein higher certainty predicted diminished beliefs in one's abilities, decreased career interests, and lowered expectations for future performance.

The aim of the present research was to examine one factor that may moderate or help buffer individuals from these harmful effects—individual differences in stigma consciousness. Stigma consciousness has been characterized as the extent to which a person is focused on,

concerned about, and believes they are affected by stereotypes of their group (Pinel, 1999). With regard to stereotype threat, Brown and Pinel (2003) found that when gender stereotypes were made accessible prior to taking a difficult math test, women high in stigma consciousness performed worse than women who were less stigma conscious. This finding is consistent with the rationale that stereotype threat should be greater among those who are more concerned about being negatively stereotyped (see Steele, 1997; Steele & Aronson, 1995). In addition, the Brown and Pinel (2003) findings align with other evidence which suggests that greater motivation to perform a difficult task can produce more pronounced effects of stereotype threat (Jamieson & Harkins, 2007).

However, we believe that individual differences in stigma consciousness may hold very different implications for the likelihood of stereotype validation. Previous research suggests that higher stigma consciousness is associated with greater motivation to disconfirm, discount, or react against stereotypes about one's group (Pinel, 2002, 2004). While this heightened motivation may hinder task performance, additional studies suggest that stigma consciousness may actually facilitate other strategies to disconfirm stereotypes. For example, female participants in one study were given a negative performance assessment from a male evaluator. Compared to women with low stigma consciousness, highly stigma conscious women were more likely to attribute this negative evaluation to gender discrimination (Pinel, 2004). Likewise, in another study, Pinel (2002) found that a supposed sexist male was evaluated more harshly by high rather than low stigma conscious women.

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With these findings in mind, we believe that high levels of stigma consciousness may serve to buffer—rather than accentuate—the effects of stereotype validation. Past research indicates that these certainty-inducing effects are more likely when a stereotype converges with perceptions. And, in contrast to attempts to perform well on a difficult task (e.g., Brown & Pinel, 2003), high motivation should be unlikely to impede efforts to disconfirm stereotypes in these situations. For example, in a study of childcare performance (Clark et al., 2015, Study 6), the poor performance of male but not female participants was validated after activating the gender stereotype (“men are bad at childcare”/“women are good at childcare”). Presumably, in this and other studies (see Clark et al., 2015), increased certainty occurred because the stereotype information was viewed as valid, consistent, or convergent with respect to an individual's perceptions of their own performance. Conversely, when the activated stereotype did not have an influence, it was ostensibly viewed as less valid. Thus, participants may have downplayed, disregarded, or rejected this stereotype information.

Consistent with previous research (Pinel, 2002, 2004), being highly conscious of a self-relevant stigma may be associated with increased motivation and behavior indicative of rejecting negative stereotype information. If this is true, then a negative relationship would be anticipated such that the likelihood of stereotype validation would be expected to decrease as stigma consciousness increases.

1. Research overview

Two studies were conducted and previous research (Clark & Thiem, 2016; Clark et al., 2015) was used to approximate sufficient sample sizes. Furthermore, all exclusions, manipulations, and measures are reported in the method sections. The current research examined the role of stigma consciousness within the context of performance in business economics. While research has not identified stereotype validation in this domain, past research is consistent with the possibility that accessible gender stereotypes could validate negative performance evaluations among women in business (e.g., von Hippel, Sekaquaptewa, & McFarlane, 2015). Study 1 was an initial test of our primary hypothesis that stereotype validation should be less likely as stigma consciousness increases. Study 2 extended the initial findings by incorporating a manipulation of stereotype accessibility.

2. Study 1

Participants completed a difficult test of business economics knowledge. Following the test, they received information that was designed to make the gender stereotype related to business abilities accessible. Participants then completed measures of evaluative certainty, ability beliefs, attitudes, and individual differences in stigma consciousness. Consistent with previous research on reactions to prejudice (Pinel, 2002, 2004), we hypothesized that low stigma conscious women would feel more certain they performed poorly on the test compared to (1) women with higher levels and (2) men regardless of their stigma consciousness.

3. Method

3.1. Participants and design

Six-hundred and fifty-seven U.S. citizens completed the study through Amazon Mechanical Turk in exchange for \$0.60. Gender and individual differences in stigma consciousness served as predictors. Near the conclusion of the study, participants were asked to correctly recall the stereotype information they received. Sixty-six participants failed this check and were removed from the sample. Therefore, the final sample was comprised of 591 participants (336 women and 255 men; $M_{\text{age}} = 33.68$ years, $SD = 12.10$) and approximately 78% reported they were White.

3.2. Procedure and materials

After some brief instructions, participants completed a multiple-choice quiz on business economics. This quiz consisted of eight randomly presented questions and was designed to be difficult—wherein the vast majority of participants were expected to perform poorly and view their own performance as such. For example, one question read: “Comparative advantage is the basis for:” ($A = \text{Efficient production}$, $B = \text{International trade}$, $C = \text{Economies of scale}$, $D = \text{The capital-labor tradeoff}$).

Immediately following the quiz, participants rated their performance on a scaled measure and then received the following information on a separate screen:

“Research suggests that men tend to perform better than women on tests of business economics. The research you are participating in is aimed at a better understanding of this.”

After reading this information, participants completed measures of evaluative certainty, ability beliefs, and attitudes toward business economics. Participants then reported their gender and completed an instrument developed to measure individual differences in stigma consciousness (Pinel, 1999). Lastly, participants completed an attention check, answered two additional demographic questions (race and age), and were debriefed.

3.3. Independent variable

3.3.1. Stigma consciousness

Participants completed the Stigma Consciousness Questionnaire developed by Pinel (1999). This inventory was designed to capture the extent to which individuals are chronically self-conscious of their status as a stigmatized group member. Participants rated their agreement with 10 statements on separate 7-point scales (1 = *strongly disagree* to 7 = *strongly agree*). Furthermore, participants received statements that were matched to their gender. One example was: “Stereotypes about women (men) have not affected me personally (reverse-scored).” Responses to these items were summed to form an index of stigma consciousness ($\alpha = 0.81$; $M = 43.21$, $SD = 10.13$).

3.4. Dependent measures

3.4.1. Actual performance

The number of correct responses to the eight quiz questions was used to index actual performance.

3.4.2. Perceived performance

Immediately after the quiz, but before the stereotype information, participants rated their performance on the following scale: “Overall, how well do you think you performed on the business economics quiz?” (1 = *performed extremely poorly* to 11 = *performed extremely well*).

3.4.3. Evaluative certainty

After the gender stereotype information, participants reported how certain they were about their performance on the business quiz. These 11-point items (1 = *strongly disagree* to 11 = *strongly agree*) were: “Please express how much you agree with the following statement...” (1) “I am CERTAIN that I performed POORLY on the quiz.”; (2) “I am SURE that I performed POORLY on the quiz.”; (3) “I am CERTAIN that I performed WELL on the quiz. (reverse-scored)” and (4) “I am SURE that I performed WELL on the quiz. (reverse-scored)” Responses were averaged to form a single composite ($\alpha = 0.96$; $M = 6.74$, $SD = 2.70$).

3.4.4. Ability beliefs

Following the certainty measures, participants rated their ability regarding business economics. These measures were: “Please rate your own SKILLS in business economics on the following scale.” (1 = very weak to 11 = very strong); “Please rate your own KNOWLEDGE of business economics on the following scale.” (1 = very low to 11 = very high); and “I believe that I am very knowledgeable about business economics.” (1 = strongly disagree to 11 = strongly agree). An index was created by averaging responses to these measures ($\alpha = 0.97$; $M = 4.49$, $SD = 2.49$).

3.4.5. Attitudes

Participants' completed the following attitude measures: “To what extent do you like business economics?” (1 = not at all to 11 = very much) and “I find business economics to be an interesting subject.” (1 = strongly disagree to 11 = strongly agree). Responses were averaged to form an index ($\alpha = 0.93$; $M = 5.31$, $SD = 2.72$).

3.4.6. Attention check

Following the stigma consciousness inventory, participants were asked: “After the business economics quiz, you were told which of the following?” The response options to this question were: (1) “Performance on tests of business economics tends to vary as a function of some personality variables.”; (2) “There are NO gender differences in performance on tests of business economics.”; (3) “Men tend to perform better than women on tests of business economics.”; and (4) “Performance on tests of business economics often varies based on the gender of the respondent AND your quiz performance will be compared to that of male participants.” All participants who did not select the third option were excluded from the sample (66 out of 657).

4. Results

4.1. Quiz performance

Similar to previous research (Clark et al., 2015, Study 6), the goal was to design a difficult quiz where the majority of participants would perform poorly and produce largely negative evaluations—thereby facilitating the likelihood of stereotype validation. Consistent with this aim, the mean number of correct quiz answers ($M = 3.63$, $SD = 1.37$) was below 50% (4 out of 8), $t(590) = -6.52$, $p < 0.001$. Also, mean perceived performance ($M = 5.09$, $SD = 2.43$) was significantly below the midpoint (6) of the 11-point measure, $t(590) = -9.15$, $p < 0.001$. Given this successfully constrained actual and perceived performance, these variables were treated as dependent measures rather than independent variables or study factors.

4.1.1. Actual performance

Gender and stigma consciousness were correlated, $r = 0.19$, $p < 0.001$. However, subsequent tests indicated that multicollinearity

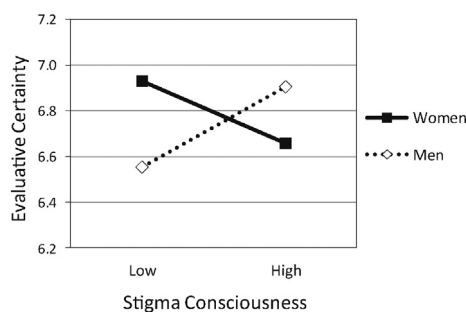


Fig. 1. Study 1 predicted values for evaluative certainty as a function of participant gender and individual differences in stigma consciousness (controlling for actual and perceived performance on the business quiz). Note: Graph is plotted at ± 1 SD on the index of stigma consciousness.

was not a concern (Gender, Tolerance = 0.95, VIF = 1.05; Stigma Consciousness, Tolerance = 0.94, VIF = 1.07). We conducted centered regression analyses (see Aiken & West, 1991) on our dependent measures. For analyses of actual and perceived performance, the centered predictors included participant gender, stigma consciousness, and their interaction. A main effect emerged such that men performed better than women, $b = -0.25$, $t(587) = -2.14$, $p = 0.032$, $r^2 = 0.008$. Also, higher stigma consciousness predicted greater performance, $b = 0.01$, $t(587) = 2.24$, $p = 0.025$, $r^2 = 0.009$. The two-way interaction was nonsignificant ($p = 0.277$).

4.1.2. Perceived performance

Men believed they had performed better than women, $b = -0.85$, $t(587) = -4.17$, $p < 0.001$, $r^2 = 0.029$. However, this gender difference was greater at higher stigma consciousness, Gender \times Stigma Consciousness interaction, $b = 0.04$, $t(587) = -2.10$, $p = 0.036$, $r^2 = 0.008$. The main effect of stigma consciousness was nonsignificant ($p = 0.627$).

4.2. Evaluative certainty

Perceived and actual performance differed by gender and, unexpectedly, as a function of stigma consciousness. Therefore, analyses on the subsequent dependent measures controlled for both perceived and actual performance by including each as a main effect predictor in the models (see Clark et al., 2015, Study 6). Analyses on evaluative certainty revealed effects that were consistent with predictions. The hypothesized Gender \times Stigma Consciousness interaction was found (see Fig. 1), $b = -0.03$, $t(585) = -2.62$, $p = 0.009$, $r^2 = 0.012$ (CI 95: -0.055 to -0.008).¹ Women tended to report greater certainty in poor performance as stigma consciousness decreased, $b = -0.01$, $t(585) = -1.85$, $p = 0.065$, $r^2 = 0.006$. In contrast, an unexpected trend emerged such that the evaluative certainty of men tended to be higher as stigma consciousness increased, $b = 0.02$, $t(585) = 1.91$, $p = 0.057$, $r^2 = 0.006$. Furthermore, at relatively low stigma consciousness (-1 SD), women reported greater certainty than men, $b = 0.38$, $t(585) = 2.38$, $p = 0.017$, $r^2 = 0.010$ (CI 95: 0.068 to 0.698). However, men and women did not differ at higher stigma consciousness ($+1$ SD), $b = -0.25$, $t(585) = -1.42$, $p = 0.156$. A main effect of perceived performance also emerged, $b = -0.96$, $t(585) = -39.66$, $p < 0.001$, $r^2 = 0.729$ (all remaining $ps > 0.58$).

4.3. Direct and indirect effects on ability beliefs and attitudes

4.3.1. Ability beliefs

Men reported higher ability in business economics than women, $b = -0.47$, $t(585) = -3.25$, $p = 0.001$, $r^2 = 0.018$. Perceived performance was also a significant predictor, $b = 0.74$, $t(585) = 25.23$, $p < 0.001$, $r^2 = 0.521$ (all remaining $ps \geq 0.88$).

We hypothesized that differences in evaluative certainty as a function of gender and stigma consciousness should hold downstream implications for people's beliefs in their own abilities and attitudes toward business economics. Among participants who were relatively low in stigma consciousness (-1 SD), we found that women reported they were more certain of their poor performance than men. Compared to their male counterparts, we predicted that the elevated certainty experienced by these low stigma conscious women would predict lowered beliefs about one's abilities and less favorable attitudes related to the performance domain.² However, we expected that evaluative certainty would not play a mediational role among men and women with relatively high stigma consciousness ($+1$ SD)—consistent with

¹ This effect was non-significant ($p = 0.654$) when perceived and actual performance were not controlled.

² Bivariate correlations: evaluative certainty and ability beliefs, $r = -0.71$; evaluative certainty and attitudes, $r = -0.49$; ability beliefs and attitudes, $r = 0.62$.

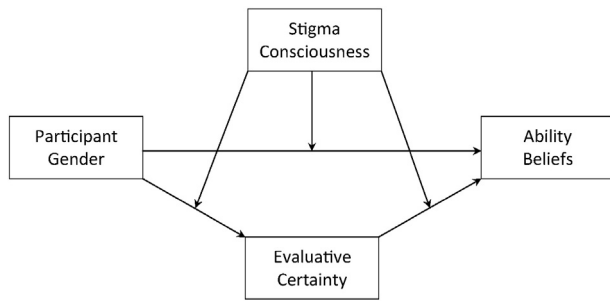


Fig. 2. Hypothesized moderated-mediation model on ability beliefs for Study 1 (controlling for actual and perceived performance on the business quiz; see PROCESS Model 59, Hayes, 2014).

the lack of a gender difference in certainty found in the reported regression analyses.

These moderated-mediation predictions were tested using Model 59 of the PROCESS macro (Hayes, 2014). As displayed in Fig. 2, this model allowed stigma consciousness to moderate each relationship between gender (independent variable), evaluative certainty (mediator), and ability beliefs/attitudes (dependent variable) while also controlling for actual and perceived performance. Furthermore, the data were treated as the population and 10,000 bootstrap samples were drawn (with replacement) to create 95% bias-corrected confidence intervals (BC CIs). The results are displayed in Table 1. At relatively low stigma consciousness (-1 SD), women were more certain they performed poorly than men and, in turn, higher certainty predicted decreased beliefs in one's own business economics ability. Moreover, this indirect effect was significant. Conversely, evaluative certainty did not mediate the relationship between gender and ability beliefs among participants with higher stigma consciousness ($+1$ SD).

4.3.2. Attitudes

Men reported more favorable attitudes toward business economics than women, $b = -0.62$, $t(585) = -3.01$, $p = 0.003$, $r^2 = 0.015$. Also, both actual ($b = 0.24$, $t(585) = -3.29$, $p = 0.001$, $r^2 = 0.018$) and perceived performance ($b = 0.48$, $t(585) = 11.31$, $p < 0.001$, $r^2 = 0.179$) were significant predictors (all remaining $ps > 0.60$).

The moderated-mediation analysis showed a pattern of results that was consistent with our predictions and the findings on ability beliefs. The gender difference in evaluative certainty at relatively low stigma consciousness (-1 SD) was found to predict less favorable attitudes toward business economics and this indirect effect was significant. However, certainty was not a mediator at higher levels of stigma consciousness ($+1$ SD).

4.4. Discussion

Study 1 provided initial evidence that stigma consciousness may buffer the effects of stereotype validation among women. Consistent with predictions, evaluative certainty did not differ between men and women who were higher in stigma consciousness ($+1$ SD). However at relatively low stigma consciousness (-1 SD), women were more certain they had performed poorly than men and these differences predicted more negative beliefs and attitudes related to business economics.

Also, men tended to be less certain of their poor performance as stigma consciousness decreased. While not hypothesized, this finding is consistent with our conceptualization about the role of stigma consciousness. As previously discussed, we predicted that low stigma conscious women would be influenced by the stereotype information (i.e., women are worse than men at business) because they may be likely to view it as convergent or valid with respect to their negative performance evaluation. It stands to

reason that low stigma consciousness in men also facilitates the perceived validity of gender stereotypes. If this is true, then one would expect ratings of evaluative certainty to be more stereotype-consistent among low stigma conscious men. Specifically, as observed in Study 1, low stigma conscious males should tend to be less certain they performed poorly or, in essence, more certain they performed well—consistent with the stereotype that “men are good or better than women at business.”

5. Study 2

Study 2 was designed to replicate and extend the previous findings by incorporating a manipulation of stereotype accessibility. When the gender stereotype was made salient, we expected patterns of results that parallel those found in Study 1. However, accordant with previous research and theory (see Clark et al., 2015), we believed that Gender \times Stigma Consciousness differences in evaluative certainty, beliefs, and attitudes should not emerge when gender stereotypes are relatively inaccessible.

6. Method

6.1. Participants and design

Thirteen hundred and sixteen U.S. citizens completed the study on Amazon Mechanical Turk and received \$0.60. Participants were randomly assigned to a condition in which gender stereotype information either was or was not presented after completing a business economics quiz. Individual differences in stigma consciousness were measured and indexed using the same procedures from Study 1 ($\alpha = 0.83$; $M = 43.36$, $SD = 10.45$). One hundred and forty-eight participants were removed from the sample because they failed the same attention check used in Study 1. Thus, the final sample included 1168 participants (706 women and 462 men; $M_{age} = 36.65$ years, $SD = 13.16$) and approximately 78% were White.

6.2. Procedure, materials, and measures

The procedure was identical to Study 1, with the following exception. Gender stereotype accessibility was manipulated after participants finished the business quiz and rated their performance. Participants who were assigned to the stereotype information-present condition received stereotype information that was identical to that used in Study 1. Conversely, participants in the stereotype information-absent condition were told:

“Research suggests that performance on tests of business economics tends to vary as a function of some personality variables. The research you are participating in is aimed at a better understanding of this.”

7. Results

7.1. Quiz performance

As in Study 1, both actual and perceived quiz performance were treated as dependent measures. The mean number of correct answers ($M = 3.72$, $SD = 1.38$) was below 50%, $t(1167) = -6.86$, $p < 0.001$, and mean perceived performance ($M = 5.22$, $SD = 2.29$) was below the midpoint of the scale, $t(1167) = -11.66$, $p < 0.001$.

7.1.1. Actual performance

Gender and stigma consciousness were correlated, $r = 0.21$, $p < 0.001$. However, tests indicated that multicollinearity would not be a concern for subsequent analyses (Gender: Tolerance = 0.93, VIF =

Table 1
Results of bootstrapping moderated mediation analyses in Study 1.

	Participant gender → evaluative certainty <i>b</i> (<i>SE</i>)	Evaluative certainty → beliefs or attitudes <i>b</i> (<i>SE</i>)	Estimated indirect effect <i>b</i> (<i>SE</i>)	95% BC CI
Ability Beliefs				
Low stigma consciousness (−1 <i>SD</i>)	0.383* (0.160)	−0.557*** (0.048)	−0.215 (0.095)	−0.4249, −0.0450
High stigma consciousness (+1 <i>SD</i>)	−0.251 (0.178)	−0.643*** (0.048)	0.161 (0.116)	−0.0540, 0.4029
Attitudes				
Low stigma consciousness (−1 <i>SD</i>)	0.383* (0.160)	−0.339*** (0.077)	−0.131 (0.067)	−0.2979, −0.0293
High stigma consciousness (+1 <i>SD</i>)	−0.251 (0.178)	−0.367*** (0.077)	0.091 (0.070)	−0.0215, 0.2620

Note: BC CI = bias-corrected confidence interval. Bold indicates reliable indirect effect, where BC CI does not include zero.

* $p < 0.05$.

*** $p < 0.001$.

1.07; Stigma Consciousness: Tolerance = 0.89, $VIF = 1.13$).³ Centered regressions were conducted on the dependent measures. For analyses of actual and perceived performance, the centered predictors included participant gender, stigma consciousness, stereotype condition, and all interaction terms. On actual performance, men performed better than women, $b = -0.29$, $t(1160) = -3.35$, $p = 0.001$, $r^2 = 0.010$ (all remaining $ps > 0.11$).

7.1.2. Perceived performance

Men rated their performance higher than women, $b = -0.92$, $t(1160) = -6.62$, $p < 0.001$, $r^2 = 0.036$ (all remaining $ps > 0.27$).

7.2. Evaluative certainty

Actual and perceived performance differed as a function of gender. Thus, analyses of the dependent measures controlled for these differences by including main effect predictors of actual and perceived performance. As shown in Fig. 3, a Gender × Stigma Consciousness × Gender Stereotype interaction emerged on the composite of evaluative certainty ($\alpha = 0.94$; $M = 6.67$, $SD = 2.59$), $b = -0.04$, $t(1158) = -2.45$, $p = 0.014$, $r^2 = 0.005$ (CI 95: -0.078 to -0.009).⁴

When the gender stereotype was made salient after the quiz, the results replicated those of Study 1. Evaluative certainty differed as a function of a Gender × Stigma Consciousness interaction, $b = -0.04$, $t(1158) = -3.37$, $p = 0.001$, $r^2 = 0.010$ (CI 95: -0.065 to -0.017). As stigma consciousness decreased, women were more certain they had performed poorly, $b = -0.02$, $t(1158) = -2.59$, $p = 0.010$, $r^2 = 0.006$ (CI 95: -0.032 to -0.004). Conversely, men reported higher certainty as stigma consciousness increased, $b = 0.02$, $t(1158) = 2.37$, $p = 0.018$, $r^2 = 0.005$ (CI 95: 0.004 to 0.040). Among participants who were relatively low in stigma consciousness (−1 *SD*), evaluative certainty was higher in women than men, $b = 0.70$, $t(1158) = 4.20$, $p < 0.001$, $r^2 = 0.015$ (CI 95: 0.372 to 1.025). At higher stigma consciousness (+1 *SD*), however, no gender difference in certainty emerged ($p = 0.394$). In sharp contrast to the findings in the stereotype information-present condition, no Gender × Stigma Consciousness effect emerged when the stereotype information was absent ($p = 0.853$).

Several other effects were found in addition to the three-way interaction. Women were more certain of poor performance than men, $b = 0.24$, $t(1158) = 2.72$, $p = 0.007$, $r^2 = 0.006$. Women reported greater certainty than men as stigma consciousness decreased, Gender × Stigma

Consciousness effect, $b = -0.02$, $t(1158) = -2.19$, $p = 0.029$, $r^2 = 0.004$. Actual ($b = -0.07$, $t[1158] = -2.24$, $p = 0.026$, $r^2 = 0.004$) and perceived ($b = -0.94$, $t[1158] = -51.56$, $p < 0.001$, $r^2 = 0.697$) performance were also significant predictors (all remaining $ps > 0.30$).

7.3. Direct and indirect effects on ability beliefs and attitudes

7.3.1. Ability beliefs

Men reported higher beliefs in their business economics ability than women on this index ($\alpha = 0.96$; $M = 4.43$, $SD = 2.43$), $b = -0.46$, $t(1158) = -4.19$, $p < 0.001$, $r^2 = 0.015$. This effect was qualified by a Gender × Gender Stereotype interaction, $b = 0.43$, $t(1158) = 2.00$, $p = 0.046$, $r^2 = 0.003$. The gender difference was larger in the stereotype information-absent ($b = -0.68$, $t(1158) = -4.38$, $p < 0.001$, $r^2 = 0.016$) than the stereotype information-present ($b = -0.25$, $t(1158) = -1.60$, $p = 0.110$) condition. Moreover, beliefs among men tended to be higher in the stereotype-absent condition ($b = -0.27$, $t(1158) = -1.80$, $p = 0.072$), but no condition difference emerged among women ($p = 0.309$). Perceived quiz performance was also a significant predictor, $b = 0.71$, $t(1158) = 30.84$, $p < 0.001$, $r^2 = 0.451$.

The Gender × Stigma Consciousness × Gender Stereotype interaction was marginally significant, $b = 0.04$, $t(1158) = 1.85$, $p = 0.064$, $r^2 = 0.002$ (all remaining $ps > 0.38$). In the stereotype information-present condition, a two-way interaction emerged, $b = 0.03$, $t(1158) = 1.97$, $p = 0.049$, $r^2 = 0.003$. As stigma consciousness decreased, there were nonsignificant trends such that women reported lower ability beliefs ($b = 0.01$, $t[1158] = 1.27$, $p = 0.205$), whereas men reported higher beliefs ($b = -0.02$, $t[1158] = -1.57$, $p = 0.116$). No interaction pattern emerged in the stereotype information-absent condition ($p = 0.493$).

As in Study 1, we expected evaluative certainty to play a mediational role among low but not high stigma consciousness participants who received the gender stereotype information (see Fig. 2 and Table 1). However, we did not expect any indirect effects of evaluative certainty for participants in the stereotype information-absent condition—regardless of their stigma consciousness level. To test these predictions, we used PROCESS Model 73 (Hayes, 2014). This model afforded both the stereotype manipulation and stigma consciousness to moderate each relationship between gender (independent variable), evaluative certainty (mediator), and ability beliefs/attitudes (dependent variable).⁵ Actual and perceived performance were also controlled.

The results showed patterns that were consistent with our hypotheses and the findings of Study 1 (see Table 2). When the gender

³ A centered regression revealed that stigma consciousness was higher among women than men ($b = 4.38$, $t(1164) = 7.18$, $p < 0.001$, $r^2 = 0.042$) and when the stereotype information was present than absent ($b = 1.45$, $t(1164) = 2.43$, $p = 0.015$, $r^2 = 0.005$). However, no Gender × Condition interaction emerged ($p = 0.117$).

⁴ This interaction was non-significant ($p = 0.218$) when perceived and actual performance were not controlled.

⁵ Bivariate correlations: evaluative certainty and ability beliefs, $r = -0.73$; evaluative certainty and attitudes, $r = -0.46$; ability beliefs and attitudes, $r = 0.62$.

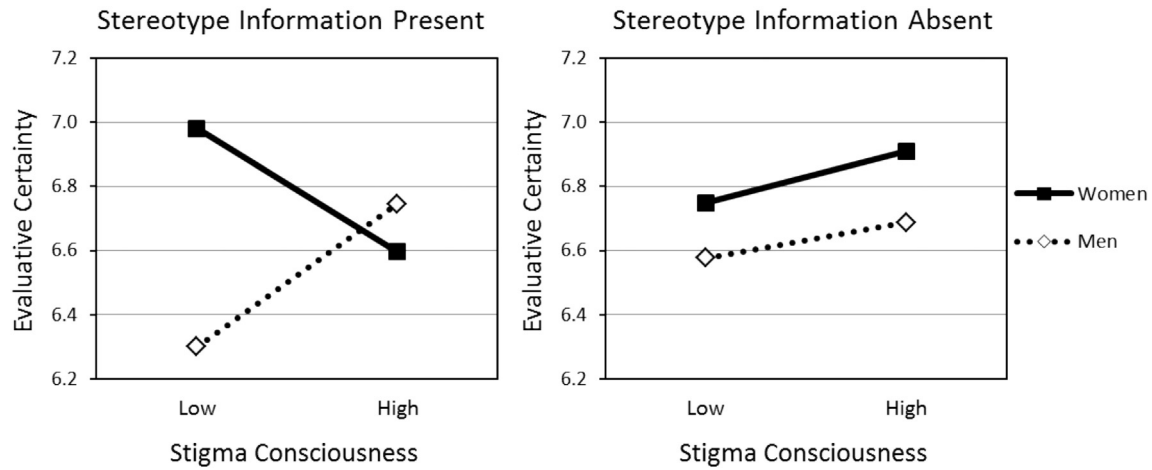


Fig. 3. Study 2 predicted values for evaluative certainty as a function of participant gender, individual differences in stigma consciousness, and the gender stereotype manipulation (controlling for actual and perceived performance on the business quiz). Note: Graph is plotted at ± 1 SD on the index of stigma consciousness.

Table 2
Results of bootstrapping moderated mediation analyses on ability beliefs in Study 2.

	Participant gender \rightarrow evaluative certainty b (SE)	Evaluative certainty \rightarrow ability beliefs b (SE)	Estimated indirect effect b (SE)	95% BC CI
Stereotype information present				
Low stigma consciousness (-1 SD)	0.692*** (0.164)	-0.496 *** (0.045)	-0.339 (0.101)	$-0.5565, -0.1634$
High stigma consciousness ($+1$ SD)	-0.154 (0.183)	-0.483 *** (0.044)	0.074 (0.092)	$-0.1014, 0.2620$
Stereotype information absent				
Low stigma consciousness (-1 SD)	0.170 (0.164)	-0.456 *** (0.047)	-0.074 (0.059)	$-0.1974, 0.0389$
High stigma consciousness ($+1$ SD)	0.223 (0.200)	-0.506 *** (0.050)	-0.111 (0.086)	$-0.2845, 0.0525$

Note: BC CI = bias-corrected confidence interval. Bold indicates reliable indirect effect, where BC CI does not include zero.

*** $p < 0.001$.

stereotype was present for participants with low stigma consciousness (-1 SD), women reported higher certainty in poor performance than men. In addition, higher certainty as a function of this effect predicted lower beliefs in one's business economics ability. For participants in the stereotype information-present condition with higher stigma consciousness ($+1$ SD), no evidence of mediation emerged. Furthermore, no indirect effects were found when the gender stereotype was not made salient.

7.3.2. Attitudes

Men were more favorable than women on the index of business economics attitudes ($\alpha = 0.93$; $M = 5.06$, $SD = 2.77$), $b = -0.90$, $t(1158) = -5.83$, $p < 0.001$, $r^2 = 0.028$. Also, attitudes were more favorable in the stereotype information-absent than the stereotype information-present condition, $b = -0.43$, $t(1158) = -2.92$, $p = 0.004$, $r^2 = 0.007$. A main effect of perceived performance was also found, $b = 0.49$, $t(1158) = 15.07$, $p < 0.001$, $r^2 = 0.164$ (all remaining $ps > 0.11$).

The PROCESS analysis revealed a pattern that mirrored the results on ability beliefs (see Table 3). Among participants in the stereotype information-present condition with low stigma consciousness (-1 SD), women were more certain they had performed poorly than men and this elevated certainty predicted more negative attitudes toward business economics. In contrast, evaluative certainty was not a mediator among highly stigma conscious participants ($+1$ SD) in the stereotype information-present condition or all participants in the stereotype information-absent condition.

7.4. Discussion

Study 2 offered additional support for the hypothesized role of stigma consciousness. When the gender stereotype was made accessible

after the business quiz, no evidence of stereotype validation emerged between highly stigma conscious ($+1$ SD) women and men. However, at lower stigma consciousness (-1 SD), women were more certain they performed poorly than men. In turn, these differences in evaluative certainty predicted diminished ability beliefs and less favorable attitudes toward business economics—replicating the findings of Study 1. Importantly, the data further indicated that these effects may only emerge when group stereotypes become salient after performance. When stereotype information was not provided, no Gender \times Stigma Consciousness differences in certainty or related consequences were found.

8. General discussion

Past research has found that making negative stereotypes salient after performance may serve to validate how stigmatized individuals believe they performed on a task (Clark et al., 2015). The current research was designed to examine how dispositional differences in stigma consciousness may moderate these effects. Previous research has shown that women high in stigma consciousness may often reject or react against perceived gender bias (Pinel, 2002, 2004). Therefore, when negative gender stereotypes become salient following a task, we postulated that highly stigma conscious women would reject this information and be less susceptible to stereotype validation than low stigma conscious women. The findings from two studies supported this conceptualization. For low stigma conscious women, evidence suggests that gender stereotype accessibility validated their performance perceptions and had a negative influence on their relevant beliefs and attitudes. Conversely, no evidence of stereotype validation emerged among women with relatively high stigma consciousness.

In these studies, participants completed a difficult test in a domain where strong gender stereotypes about performance likely exist. Based on past research (e.g., Spencer, Steele, & Quinn, 1999), these

Table 3
Results of bootstrapping moderated mediation analyses on attitudes in Study 2.

	Participant gender → evaluative certainty <i>b</i> (SE)	Evaluative certainty → attitudes <i>b</i> (SE)	estimated indirect effect <i>B</i> (SE)	95% BC CI
Stereotype information present				
Low stigma consciousness (−1 SD)	0.692*** (0.164)	−0.365*** (0.067)	−0.232 (0.075)	−0.4100, −0.1094
High stigma consciousness (+1 SD)	−0.154 (0.183)	−0.357*** (0.066)	0.053 (0.068)	−0.0657, 0.2037
Stereotype information absent				
Low stigma consciousness (−1 SD)	0.170 (0.164)	−0.346*** (0.070)	−0.055 (0.046)	−0.1615, 0.0241
High stigma consciousness (+1 SD)	0.223 (0.200)	−0.251*** (0.075)	−0.046 (0.044)	−0.1698, 0.0123

Note: BC CI = bias-corrected confidence interval. Bold indicates reliable indirect effect, where BC CI does not include zero.

*** $p < 0.001$.

factors alone might have created some degree of stereotype threat among female participants—perhaps regardless of their stigma consciousness. However, in Study 2 the post-performance stereotype manipulation also carried effects as a function of participant gender and stigma consciousness. Thus, these and other current results provide strong support for the presence of stereotype validation as well.

These findings should hold many implications and open the door to several avenues for future study. For instance, one limitation of the current research is that the specific, hypothesized mechanism—motivation to disconfirm stereotypes—was not directly assessed. Follow-up work could test whether this potential mechanism or others are responsible for the key effects of stigma consciousness that emerged. Future research could also examine how the current findings extend to other performance domains. Previous research has found evidence of stereotype validation in several situations including the performance of women and African Americans in math and men with regard to childcare (Clark et al., 2015). Given that similar validation effects emerged in the current studies, it is plausible that stigma consciousness could play a role in these and other domains in which negative stereotypes may become salient after performance.

We look forward to addressing these possibilities. Furthermore, we hope that the current research sparks future inquiry into stereotype influences within and beyond the context of task performance.

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