Professors' "Feminine" Behavioral Cues in the Classroom Close Gender Gaps in Participation: Supplemental Materials

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Types of Participation Categories Included in Raw Participation Score

Research assistants coded the following forms of participation, which were included in the raw participation score: (1) The student raised their hand and was called on immediately by the professor (1832 instances, 62.6%), (2) The student raised their hand but was not called on immediately by the professor (i.e., the student was called on after other student(s); 197 instances, 6.7%), (3) The student raised their hand but was never called on by the professor (531 instances, 18.1%), (4) The student was cold called (i.e., the student's hand was not raised, but the professor called on them; 175 instances, 6.0%), (5) The student spoke without raising their hand (241 instances, 8.2%).

Thin-Slice Coding Scheme for Professor's Behaviors During Lecture

Below are the instructions the research assistants followed when coding professors' behaviors during the first 30 seconds of lecturing.

Professor's Warmth

Code: The extent to which the professor demonstrates warmth.

Description: The extent to which the professor translates warmth and inclusion in the classroom. This "emitted energy" of warmth and inclusivity may be translated through humor, tone, inflection in voice, and the pace in which the professor speaks. For example, someone who pauses to let points sink in or varies their pace at times would appear warmer and more approachable/inviting/open to questions. Body language (e.g., consistent eye contact, hand movements, walking around, relaxed body posture) are other ways of conveying a warm energy.

Warmth Rating Scale:

1 = Cold (Professor has 2+ of these):

- Inconsistent eye contact
- Style of speaking does not invite interruption or questions
- Low energy (movement or monotone)

2 = Slightly Cold (Professor has 1 of these):

- Inconsistent eye contact
- Style of speaking does not invite interruption or questions
- Low energy (movement or monotone)

3 = Neutral:

- Good eye contact
- Style of speaking invites interruption or questions
- Average energy movement or voice inflection

4 = Slightly Warm (Professor has 2+ of these):

- Good eye contact
- Style of speaking invites interruption or questions
- High energy movement or voice inflection

5 = Most Warm (Professor has 3+ of these):

- Good eye contact
- Style of speaking invites interruption or questions
- High energy movement or voice inflection
- Humor
- Disarming themselves explicitly through words (e.g., this won't be a typical class, more like a seminar)

Professor's Likability

Code: The extent to which the professor creates a classroom that is likeable/appealing.

Description: Likeable can be described as answering the question: "Would I like to take a class with this professor?" In this case, the professor may not be warm, but their thoughtfulness in using engaging tactics (e.g., examples, voice inflection, questions, etc.) and clear language or the ease with which the professor conveys continuous thoughts that assists in learning would make the class more likeable. This rating would also incorporate student body language and attentiveness, in contrast to warmth, which is purely about the professor's emitted energy.

Responsiveness Rating Scale:

1 = Least likeable (e.g., boring, monotone, not engaging in classroom movements, looks down or back at slides, doesn't interact with students, students appear disengaged)

2 = Slightly less likeable than average

3 = Average likeable

4 = Slightly more likeable than average

5 = Most likeable (e.g., engaged class, conveying ideas clearly, inflections in tone, walking around and using movement, asking questions, students laugh and have energy)

Professor's Comfort

Code: The extent to which the professor appears comfortable teaching.

Description: A professor would be considered "most comfortable" if they appear to be confident and at ease when lecturing and speaking to students. Their body language would appear more at ease than awkward. A professor who seems less confident, less at ease, and/or who is displaying awkward or uncomfortable body language would receive a lower score on this dimension.

Comfort Rating Scale:

1 = Least comfortable

2 = Slightly less comfortable than average

3 = Average comfort

4 = Slightly more comfortable than average

5 = Most comfortable

Professor's Formality (Reverse-Scored)

Code: The extent to which the professor does not appear overly formal with students.

Description: In this sample, professors will appear generally formal in their demeanor. Therefore, look for cues that indicate *less* formality, and more casualness. Start by giving each professor a rating of a 5. Then, look for specific indicates that would lower professors' formality score. For each indicator of lower formality, give the professor a lower rating. The following are examples (not exhaustive) of indicators of lower formality: a professor seems to use humor, sits, or has an otherwise relaxed posture, chats lightly with students.

Formality Rating Scale:

1 = Not at all formal

2 = Highly below average formality (i.e., just formal)

3 = Moderately below average formality (i.e., fairly formal)

4 = Slightly below average formality (i.e., very formal)

5 = Average formality (i.e., extremely formal)

Additional Student Level Video Coding

Student Confidence

For each instance of participation, coders rated how confident the student was in their participation on a scale from 1 (*least confident*) to 5 (*most confident*). Coders were encouraged to use the full scale as appropriate. We then computed an average confidence score based on these ratings. Students' average hand-raising confidence (M = 3.13, SD = 1.04) and average speaking confidence (M = 3.45, SD = 0.87) were separately rated.

Results

Analysis Plan

We conducted 2-level mixed-effects moderation analyses to examine whether different course features moderated how gender affects student hand-raising and speaking confidence. As reported in the main text, students were nested within class sessions using student gender (0 = women, 1 = men) as a predictor, controlling for professor's gender (0 = women, 1 = men) and classroom gender diversity.

Student Hand-Raising Confidence

We did not find a significant difference in hand-raising confidence between men or women, b = .036, t = 0.58, p = .563, 95% CI [-0.09, 0.16].

Student Speaking Confidence

We did not find a significant difference in speaking confidence between men or women, b = -.012, t = -0.23, p = .820, 95% CI [-0.11, 0.09].

Course Syllabus Coding Procedure

In addition to coding the professor's behavior during lecture, we also coded for several features present in the course syllabus (see Table S1). There was sufficient interrater reliability

(Mean r = .821) after research assistants coded 20% of the syllabus. Before individually coding the remaining syllabi, research assistants discussed and resolved disagreements. Research assistants coded the course syllabus for whether the following were present (0 = not present, 1 = present): cold-calling, improved learning as a reason for participation, demonstration of knowledge as a reason for participation, encouragement regarding contact with professor, participation to benefit others, and presence of peer evaluation. Research assistants also coded for the extent to which goals emphasized student learning or performance (M = 0.70, SD = 0.90; -2 = strongly performance, -1 = mild performance, 0 = neutral, 1 = mild learning, 2 = strongly learning), the extent to which the syllabus used warm language (M = 0.50, SD = 0.86; -2 = very cold, -1 = mildly/slightly cold, 0 = neutral, 1 = mildly/slightly warm, 2 = very warm), and the extent to which the syllabus emphasized community (M = 0.80, SD = 0.88; -2 = strongly individual, -1 = slightly individual, 0 = neutral, 1 = slightly community, 2 = strongly community). We also coded the percentages of the course grade being based on group work (M = 34.82, SD = 26.41), individual work (M = 46.76, SD = 30.34), and participation (M = 13.72, SD = 8.86).

Table S1

Descriptive Statistics for Course Syllabus Variables

Moderator Variable	*n*	*M*	*SD*
Cold-Calling Presence	75.00	0.37	0.49
Participation for Learning	76.00	0.47	0.50
Participation for Performance	76.00	0.63	0.49
Encouraged Professor Contact	76.00	0.32	0.47
Participation to Benefit Others	76.00	0.36	0.48
Peer Evaluation Presence	76.00	0.51	0.50
Learning Goals Emphasis	76.00	0.70	0.90
Syllabus Warmth	76.00	0.50	0.86
Community Emphasis	76.00	0.80	0.88
Team Grade	76.00	34.82	26.41
Individual Grade	76.00	46.76	30.34
Participation Grade	76.00	13.72	8.86

Results

Table S2 provides full statistical results examining the effect of student gender on raw participation score as a function of the various course syllabus coding.

Analysis Plan

We conducted 2-level mixed-effects moderation analyses to examine whether different course syllabus coding moderated how gender affects raw participation score. As reported in the main text, students were nested within class sessions using student gender (0 = woman, 1 = man)

as a predictor, controlling for professor's gender (0 = woman, 1 = man) and classroom gender diversity.

Table S2

Course Syllabus Variables as Moderators on Raw Participation Score Results

Moderator					
Predictor	*b*	*t*	*p*	95% CI lower	95% CI higher
Cold-Call Presence					
Classroom Gender Diversity	-.941	-1.84	.070	-1.96	0.08
Professor Gender	.412	1.60	.114	-0.10	0.92
Student Gender	.186	2.85	.004	0.06	0.31
Cold-Call	.157	0.95	.342	-0.17	0.48
Student Gender × Cold-Call	.197	1.83	.067	-0.01	0.41
Participation Learning					
Classroom Gender Diversity	-.666	-1.33	.189	-1.67	0.34
Professor Gender	.364	1.42	.160	-0.15	0.87
Student Gender	.217	3.15	.002	0.08	0.35
Participation Learning	.153	0.979	.330	-0.16	0.46
Student Gender × Participation Learning	.098	0.95	.340	-0.10	0.30
Participation Performance					
Classroom Gender Diversity	-.781	-1.54	.129	-1.79	0.23
Professor Gender	.411	1.58	.120	-0.11	0.93
Student Gender	.249	2.85	.004	0.08	0.42
Participation Performance	-.042	-0.26	.797	-0.37	0.28
Student Gender × Participation Performance	.189	0.17	.868	-0.19	0.23
Professor Contact					
Classroom Gender Diversity	-.752	-1.51	.136	-1.75	0.24
Professor Gender	.361	1.41	.164	-0.15	0.87
Student Gender	.220	3.56	<.001	0.10	0.34
Professor Contact	.172	1.02	.311	-0.16	0.51
Student Gender × Professor Contact	.129	1.17	.243	-0.09	0.34
Participation to Benefit Others					
Classroom Gender Diversity	-.811	-1.61	.111	-1.81	0.19
Professor Gender	.395	1.53	.130	-0.12	0.91
Student Gender	.270	4.32	<.001	0.15	0.39

Participation to Benefit Others	.197	1.20	.233	-0.13	0.52
Student Gender × Participation to Benefit Others	-.029	-0.27	.791	-0.24	0.18
Presence of Peer Evaluations					
Classroom Gender Diversity	-.769	-1.51	.135	-1.78	0.24
Professor Gender	.401	1.54	.129	-0.12	0.92
Student Gender	.254	3.51	<.001	0.11	0.40
Peer Evaluations	.051	0.32	.749	-0.26	0.36
Student Gender × Peer Evaluations	.014	0.14	.891	-0.19	0.21
Learning Goals Emphasis					
Classroom Gender Diversity	-.770	-1.50	.138	-1.79	0.25
Professor Gender	.404	1.54	.129	-0.12	0.93
Student Gender	.244	3.65	<.001	0.11	0.38
Learning Goals	-.007	-0.07	.943	-0.19	0.18
Student Gender × Learning Goals	.024	0.39	.697	-0.10	0.14
Syllabus Warmth					
Classroom Gender Diversity	-.772	-1.53	.131	-1.78	0.23
Professor Gender	.391	1.51	.136	-0.13	0.91
Student Gender	.250	4.10	<.001	0.13	0.37
Syllabus Warmth	.056	0.60	.548	-0.13	0.24
Student Gender × Syllabus Warmth	.020	0.33	.744	-0.10	0.14
Community Emphasis					
Classroom Gender Diversity	-.601	-1.22	.225	-1.58	0.38
Professor Gender	.280	1.10	.277	-0.23	0.79
Student Gender	.200	3.09	.002	0.07	0.33
Community	.136	1.53	.129	-0.04	0.31
Student Gender × Community	.088	1.55	.121	-0.02	0.20
Team Grade					
Classroom Gender Diversity	-.808	-1.59	.116	-1.82	0.20
Professor Gender	.392	1.50	.137	-0.13	0.91
Student Gender	.201	2.32	.021	0.03	0.37
Team Grade	.001	0.19	.853	-0.01	0.01
Student Gender × Team Grade	.002	0.86	.390	0.00	0.01
Individual Grade					
Classroom Gender Diversity	-.924	-1.70	.093	-2.01	0.16
Professor Gender	.428	1.63	.107	-0.10	0.95
Student Gender	.140	1.40	.160	-0.06	0.34
Individual Grade	.000	0.05	.961	-0.01	0.01
Student Gender × Individual Grade	.002	1.41	.157	0.00	0.01

Participation Grade					
Classroom Gender Diversity	-1.02	-2.16	.034	-1.96	-0.08
Professor Gender	.502	2.08	.041	0.02	0.98
Student Gender	.215	2.31	.021	0.03	0.40
Participation Grade	.025	2.96	.004	0.01	0.04
Student Gender × Participation Grade	.003	0.59	.556	-0.01	0.02

Note. Results from a 2-level mixed model using student gender (0 = woman, 1 = man) as a predictor on raw participation score as a function of the course syllabus coding variables controlling for professor's gender (0 = woman, 1 = man) and classroom gender diversity (mean-centered).

Primary Analyses Using Second Segment of Split Classes

We report the analyses on our primary dependent variables using the second segment of split class sessions instead of the first segment. We conduct the same analyses and include the same covariates (i.e., professor's gender and classroom gender diversity) as reported in the main text.

Raw Participation

There was a gender gap in the number of participation instances such that women participated less than men, $b = .225$, $t = 4.55$, $p < .001$, 95% CI [0.13, 0.32].

Participation Discrepancy Score

We also found a gender gap in participation when using the participation discrepancy score, F (3148) = 21.20, $p < .001$, $\eta_p^2 = .007$. That is, women (vs. men) participated less than expected if all students participated equally, $b = .226$, $p < .001$, 95% CI [0.13, 0.32].

Moderator: Professor Feminine Behavioral Cues

Raw participation score. We found a significant main effect of student gender such that women participated less than men, $b = .267$, $t = 5.21$, $p < .001$, 95% CI [0.17, 0.37]. There was

no significant main effect of professor feminine behavioral cues, b = -.123, t = -1.12, p = .268, 95% CI [-0.34, 0.10]. Importantly, we found a significant student gender × professor feminine behavioral cues interaction, b = -.305, t = -4.29, p < .001, 95% CI [-0.46, -0.17].

Consistent with our predictions, when professors exhibit feminine behaviors cues to a lesser extent (i.e., -1 *SD*), there was a significant gender participation gap, where women participated less than men, b = .481, t = 6.55, p < .001, 95% CI [0.34, 0.53]. In contrast, when professors exhibit feminine behavioral cues to a greater extent (i.e., +1 *SD*), there was no gender participation gap, b = .053, t = 0.76, p = .447, 95% CI [-0.08, 0.19].

Alternatively, among men, there was a significant association between professor feminine behavioral cues and participation, b = -.428, t = -4.03, p < .001, 95% CI [-0.64, 0.22]. Among women, there was no significant association between professor feminine behavioral cues and participation, b = -.123, t = -1.17, p = .268, 95% CI [-0.34, 0.10].

Participation discrepancy score. We found a significant main effect of student gender such that women (vs. men) participated less than expected if all students participated equally (i.e., higher participation discrepancy scores), b = .255, t = 5.02, p < .001, 95% CI [0.16, 0.36]. There was no significant main effect of professor feminine behavioral cues, b = .000, t = 0.00, p = .988, 95% CI [-0.07, 0.07]. Importantly, there was a significant student gender × professor feminine behavioral cues interaction, b = -.286, t = -4.21, p < .001, 95% CI [-0.42, -0.15]. Specifically, when professors exhibit feminine behavioral cues to a lesser extent, there was a significant gender participation gap where women had lower participation discrepancy scores than men (i.e., women participated less than what would be expected if all students participated equally than did men), b = .467, t = 6.54, p < .001, 95% CI [0.33, 0.61]. In contrast, when

professors exhibit feminine behavioral cues to a greater extent, there was no significant gender participation gap, $b = .065$, $t = 0.97$, $p = .334$, 95% CI [-0.07, 0.20].

Alternatively, among men, there was a significant association between professor feminine behavioral cues and participation discrepancy scores, $b = -.124$, $t = -2.76$, $p = .006$, 95% CI [-0.21, -0.16]. Among women, there was also a significant association between professor feminine behavioral cues and participation discrepancy scores, $b = .162$, $t = 3.14$, $p = .002$, 95% CI [0.06, 0.26].

Study 1: Additional Covariates in Primary Analyses

As reported in the main text, we also included whether the course was quantitative and years since professor's bachelor's degree as covariates in our analyses. Quantitative courses include those taught by the following departments or areas: Accounting, Decision Sciences, Finance, Managerial Economics, and Operations. Non-quantitative courses include those taught by the following departments: Healthcare Management, Innovation and Entrepreneurship, Public-Private Interface, Marketing, Management and Organizations, and Strategy. We calculated the years since the professor's bachelor's degree using the year they attained their bachelor's degree and the year the classroom videos were recorded (i.e., 2016).

We included the following covariates in our analyses: controlling for professor's gender (0 = woman, 1 = man), classroom gender diversity (mean-centered), whether the course was quantitative (0 = non-quantitative course, 1 = quantitative course), and years since professor's bachelor's degree. Specifically, for the raw participation score variable, we conducted a 2-level mixed-effects linear regression analysis in which students were nested within class sessions using student gender (dummy-coded: 0 = woman, 1 = man) as a predictor. For our participation discrepancy score measure we conducted an Analysis of Covariance (ANCOVA) using student

gender (dummy-coded: 0 = woman, 1 = man) as a predictor. See Table S3 for summary of results.

Table S3

Effect of Student Gender on Participation Using Additional Covariates

	Raw Participation Score	**Participation Discrepancy Score**
Student Gender *(1 = man)*	.260*** [0.16, 0.36]	.260*** [0.16, 0.36]
Constant	1.51	-.154
Observations	*3154*	*3154*
R-Squared	.029	.008

Note. Covariates include whether the course was quantitative (0 = *non-quantitative course*, 1 = *quantitative course*) and years since the professor's bachelor's degree in addition to our standard set of control variables as reported in the main text (i.e., professor gender, classroom gender diversity). Brackets reflect 95% CIs *** $p < .001$

Table S4

Inter-Variable Correlations of Professor Behavior Coding and Course Syllabus Variables

Variables	1	2	3	4	5	6	7
1. Professor Feminine Behavioral Cues	--						
2. Learning Goals	.122**	--					
3. Syllabus Warmth	.115**	.680**	--				
4. Community Emphasis	-.038*	.246**	.179**	--			
5. Team Grade	.146**	.067**	.071**	.437**	--		
6. Individual Grade	-.190**	.095**	.187**	-.259**	-.018	--	
7. Participation Grade	-.080**	-.014	.019	-.056**	.297**	.223**	--

Note: * $p < .05$, ** $p < .01$. Numbers below the diagonal are Pearson's *r* and numbers above the diagonal are *N* for that correlation.

Study 1: Four Dimensions as Separate Moderators

We conduct the same analysis described in the main text, but using the four dimensions—warmth, likeability, comfort, and informality—as separate moderators rather than a composite measure of feminine behavioral cues.

Warmth

Using raw participation as our outcome variable**,** we found a significant main effect of student gender such that women participated less than men, $b = .290$, t (2966) = 5.48, $p < .001$, 95% CI [0.19, 0.39]. We did not find a significant main effect of professor warmth, $b = -.117$, t (86) = -1.20, $p = .234$, 95% CI [-0.31, 0.08]. Importantly, we found a significant student gender × professor warmth cues interaction, $b = -.212$, t (3005) = -3.32, $p < .001$, 95% CI [-0.34, -0.09].

Using the participation discrepancy score as our outcome variable yielded consistent results. There was a significant main effect of student gender such that women participated less than expected (and men more than expected) if all students participated equally, $b = .276$, t (3040) = 5.28, $p < .001$, 95% CI [0.17, 0.38]. We did not find a significant main effect of professor warmth cues, $b = -.002$, t (3040) = -0.06, $p = .954$, 95% CI [-0.06, 0.06]. However, consistent with the raw participation score results, we found a significant student gender × professor warmth cues interaction, $b = -.200$, t (3039) = -3.25, $p = .001$, 95% CI [-0.32, -0.08].

Likeability

Using raw participation as our outcome variable**,** we found a significant main effect of student gender such that women participated less than men, $b = .283$, t (2966) = 5.35, $p < .001$, 95% CI [0.18, 0.39]. We did not find a significant main effect of professor likeability, $b = -.131$, t (87) = -1.23, $p = .222$, 95% CI [-0.34, 0.08]. Importantly, we found a significant student gender

× professor likeability cues interaction, b = -.218, t (3010) = -3.08, p = .002, 95% CI [-0.36, -0.08].

Using the participation discrepancy score as our outcome variable yielded consistent results. There was a significant main effect of student gender such that women participated less than expected (and men more than expected) if all students participated equally, b = .276, t (3040) = 5.28, p < .001, 95% CI [0.17, 0.38]. We did not find a significant main effect of professor likeability cues, b = -.001, t (3040) = -0.02, p = .987, 95% CI [-0.07, 0.07]. However, consistent with the raw participation score results, we found a significant student gender × professor likeability cues interaction, b = -.205, t (3039) = -3.01, p = .003, 95% CI [-0.34, -0.07].

Comfort

Using raw participation as our outcome variable**,** we found a significant main effect of student gender such that women participated less than men, b = .284, t (2966) = 5.36, p < .001, 95% CI [0.18, 0.39]. We did not find a significant main effect of professor comfort, b = -.147, t (86) = -1.55, p = .125, 95% CI [-0.34, 0.04]. Importantly, we found a significant student gender × professor comfort cues interaction, b = -.122, t (3013) = -1.99, p = .047, 95% CI [-0.24, 0.00].

Using the participation discrepancy score as our outcome variable yielded consistent results. There was a significant main effect of student gender such that women participated less than expected (and men more than expected) if all students participated equally, b = .276, t (3040) = 5.28, p < .001, 95% CI [0.17, 0.38]. We did not find a significant main effect of professor comfort cues, b = -.001, t (3040) = -0.03, p = .974, 95% CI [-0.06, 0.06]. We did not find a significant student gender × professor comfort cues interaction, b = -.115, t (3039) = -1.95, p = .051, 95% CI [-0.23, 0.00].

Informality

Using raw participation as our outcome variable**,** we found a significant main effect of student gender such that women participated less than men, $b = .276$, t (2965) = 5.22, $p < .001$, 95% CI [0.17, 0.38]. We did not find a significant main effect of professor informality, $b = -.07$, t (88) = -0.79, $p = .429$, 95% CI [-0.25, 0.11]. We did not find a significant student gender × professor informality cues interaction, $b = -.098$, t (3011) = -1.67, $p = .091$, 95% CI [-0.21, 0.02].

Using the participation discrepancy score as our outcome variable yielded consistent results. There was a significant main effect of student gender such that women participated less than expected (and men more than expected) if all students participated equally, $b = .276$, t (3040) = 5.28, $p < .001$, 95% CI [0.17, 0.38]. We did not find a significant main effect of professor informality cues, $b = .000$, t (3040) = 0.01, $p = .991$, 95% CI [-0.05, 0.06]. We did not find a significant student gender × professor informality cues interaction, $b = -.097$, t (3039) = -1.74, $p = .082$, 95% CI [-0.21, 0.01].

Study 1 Additional Exploratory Analyses

Three-Way Interaction Using Student Gender, Feminine Behavioral Cues, and Classroom Gender Composition

Analysis Plan

We conducted a 2-level mixed-effects moderation analysis with students nested within class sessions, testing a three-way interaction among student gender (0 = woman, 1 = man), professor feminine behavioral cues (mean-centered), and classroom gender composition on raw

participation. We included all two-way interactions as well, and controlled for professor gender (0 = woman, 1 = man).

Results

We found a significant main effect of student gender such that women participated less than men, $b = .676$, t (3024) = 3.77, $p < .001$, 95% CI [0.32, 1.03]. We did not find a significant main effect of professor feminine behavioral cues, $b = -.263$, t (116) = -0.65, $p = .520$, 95% CI [-1.07, 0.54]. We did not find a significant main effect of classroom gender composition, $b = .04$, t (110) = 0.36, $p = .945$, 95% CI [-1.09, 1.17]. There was not a significant student gender × professor feminine behavioral cues interaction, $b = .106$, t (3028) = 0.36, $p = .721$, 95% CI [-0.48, 0.69]. There was a significant student gender × classroom gender composition interaction, $b = -.926$, t (3028) = -2.26, $p = .024$, 95% CI [-1.73, -0.12]. There was not a significant professor feminine behavioral cues × classroom gender composition interaction, $b = .200$, t (103) = 0.23, $p = .822$, 95% CI [-1.56, 1.96]. There was not a significant student gender × professor feminine behavioral cues × classroom gender composition interaction, $b = -.701$, t (3030) = -1.10, $p = .273$, 95% CI [-1.96, 0.55].

Given that we found a significant student gender × classroom gender composition interaction on raw participation, we conducted a 2-level mixed-effects moderation analyses in which students were nested within class sessions using student gender (0 = woman, 1 = man) and classroom gender composition as well as their interaction as predictors, controlling for professor's gender (0 = woman, 1 = man) to probe the simple effects.

We found a significant main effect of student gender such that women participated less than men, $b = .706$, t (3135) = 4.01, $p < .001$, 95% CI [0.36, 1.05]. We did not find a significant main effect of classroom gender composition, $b = -.077$, t (115) = -0.14, $p = .893$, 95% CI [-1.20,

1.04]. We also found a significant student gender × classroom gender composition interaction, *b* = -1.05, *t* (3139) = -2.64, *p* = .008, 95% CI [-1.84, -0.27]. When the classroom gender composition was low (i.e., -1 *SD*), there was a significant gender participation gap such that women participated less than men, *b* = .431, *t* (3119) = 5.23, *p* < .001, 95% CI [0.27, 0.59]. However, when classroom gender composition was high (i.e., +1 *SD*), there was no gender participation gap, *b* = .128, *t* (3112) = 1.79, *p* = .074, 95% CI [-0.01, 0.27]. Alternative simple slopes analyses revealed that classroom gender composition was significantly associated with men's, *b* = -1.13, *t* (80) = -2.19, *p* = .031, 95% CI [-2.16, -0.11], but not women's raw participation, *b* = -.077, *t* (115) = -0.14, *p* = .893, 95% CI [-1.20, 1.04].

Study 2: Primary Analyses with Covariates

Per our pre-registration, we conduct analyses controlling for perception of professor as man/woman, year in school, university, race, college generation status, and major.

Analysis Plan

We conducted a 2 (gender: man vs. woman) × 2 (condition: feminine behavioral cues vs. control) ANOVAs controlling for perception of professor as man/woman, year in school, university, race, college generation status, and major.

Inclusion

There was a main effect of condition on gender, *F* (432) = 13.33, *p* < .001, η_p^2 = .030, such that women indicated significantly lower levels of inclusion than men. There was also a main effect of condition, *F* (432) = 334.20, *p* < .001, η_p^2 = .437, such that participants indicated significantly greater levels of inclusion in the feminine behavioral cues (vs. control) condition. There was a significant interaction, *F* (431) = 3.91, *p* = .049, η_p^2 = .009. Consistent with our predictions, simple effects analyses revealed that in the control condition, there was a gender gap

where women (M = 3.42, SD = 1.14) indicated lower levels of inclusion than men (M = 4.06, SD = 1.25), F = 15.71, p < .001, η_p^2 = .035. In the feminine behavioral cues condition, this gender gap closes where women (M = 5.59, SD = 1.06) and men (M = 5.88, SD = 0.93) indicated similar levels of inclusion, F = 1.50, p = .221, η_p^2 < .003. Alternative slopes revealed that women (F = 257.91, p < .001, η_p^2 = .374) and men (F = 113.68, p < .001, η_p^2 = .209) indicated greater levels of inclusion in the feminine behavioral cues (vs. control) condition.

Participation

There was a main effect of gender on participation such that women indicated significantly lower levels of anticipated participation than men, F (432) = 12.93, p < .001, η_p^2 = .029. There was a main effect of condition such that participants indicated significantly higher levels of anticipated participation in the feminine behavioral cues (vs. control) condition, F (432) = 25.88, p < .001, η_p^2 = .057. The interaction did not reach statistical significance, F (431) = 1.01, p = .316, η_p^2 = .002. However, consistent with our preregistered predictions, simple effects analyses revealed that in the control condition, there was a gender gap where women (M = 3.47, SD = 1.22) indicated lower levels of participation than men (M = 4.05, SD = 1.49), F = 10.53, p < .001, η_p^2 = .024. In the feminine behavioral cues condition, the gender gap closes where women (M = 4.30, SD = 1.22) and men (M = 4.60, SD = 1.22) indicated similar levels of participation, F = 3.50, p = .062, η_p^2 < .008. Alternative slopes revealed that women (F = 23.26, p < .001, η_p^2 = .051) and men (F = 7.16, p = .008, η_p^2 = .016) indicated greater levels of anticipated participation in the feminine behavioral cues (vs. control) condition.

Moderated Mediation

Following our preregistered analyses, we conducted moderated mediation analyses to test whether the indirect effect of condition on participation through inclusion would be stronger for

women than for men (Hayes, 2013; PROCESS macro for SPSS 23, model 8, 10,000 bootstrapped samples). We found a significant moderated mediation effect, *index* = -.159, *Boot SE* = 0.08, 95% CI [-0.33, -0.01]. Specifically, the indirect effect of condition on participation through inclusion was stronger for women (b = .825, SE = .144, 95% CI [0.54, 1.11]) than for men (b = .666, SE = .129, 95% CI [0.42, 0.93]).

Study S1: Manipulating Professor Behavioral Cues Pilot Study

Method

Participants

We recruited 422 participants from Prolific Academic who indicated current student status to complete an online survey for $0.80. We excluded seven participants who indicated that they do not identify as man or woman and 39 who failed our attention check item. Our final sample was 377 participants (182 woman, M_{age} = 29.09, SD = 9.62).

Procedure

The procedure mirrored Study 2 in the main text. As noted in the main text, all participants first read a description of the school's culture, which characterized the school as embodying masculine defaults. Specifically, participants read:

> Imagine that you are a student enrolled in a prestigious, high-ranking business school. The culture of the business school emphasizes values like individual achievement, assertiveness, and taking bold actions as critical for success. The campus is highly competitive with a strong focus on networking, professional advancement, and leadership capabilities. The business school is known for its rigorous curriculum and renowned faculty who challenge students to think critically. Students at this business school compete for a limited number of positions at top consulting and investment banking jobs.

Measures

Inclusion. Participants responded to the same four items as Study 2 in the main text, α = .931, M = 5.13, SD = 1.55.

Participation. Participants responded to the same four items as Study 2 in the main text, α = .866, M = 4.90, SD = 1.44.

Manipulation Check. Participants responded to the same single item as Study 2 in the main text, M = 4.99, SD = 1.79.

Perceptions of Professor Competence. Participants indicated how competent the professor is on a single item using a scale of 1 (not at all) to 7 (very), M = 6.23, SD = .922.

Results

Analysis Plan

We conducted the same analyses as Study 2 in the main text.

Manipulation Check

Our manipulation check was successful. There was a main effect of condition on perceived professor warmth, F = 308.94, p < .001, such that participants in the feminine behavioral cues condition (M = 6.18, SD = 0.84), compared to those in the control condition (M = 3.78, SD = 1.68), perceived the professor to be warmer.

Professor Competence

There was a main effect of condition on perceived professor competence, F = 24.11, p < .001, such that participants in the feminine behavioral cues condition (M = 6.46, SD = 0.75), compared to control condition (M = 6.01, SD = 1.02), perceived the professor to be more competent.

Inclusion

There was a main effect of condition on gender, F (376) = 5.05, p = .025, η_p^2 = .013, such that women indicated significantly lower levels of inclusion than men. There was also a main effect of condition, F (376) = 133.19, p < .001, η_p^2 = .263, such that participants indicated significantly lower levels of inclusion in the control condition than those in the feminine behavioral cues condition. There was a significant interaction, F (373) = 4.28, p = .039, η_p^2 = .011. Consistent with our predictions, simple effects analyses revealed that in the control condition, there was a gender gap where women (M = 4.04, SD = 1.69) indicated greater levels of inclusion than men (M = 4.63, SD = 1.44), F = 9.25, p = .003, η_p^2 = .024. In the feminine behavioral cues condition, this gender gap closes where women (M = 5.90, SD = 1.19) and men (M = 5.92, SD = 0.88) indicated similar levels of inclusion, F = 0.02, p = .899, η_p^2 < .001. Alternative slopes, men indicated greater levels of inclusion in the feminine behavioral cues (vs. control) condition, F = 46.45, p < .001, η_p^2 = .111. Similarly, women indicated greater levels of inclusion in the feminine behavioral cues (vs. control) condition, F = 89.54, p < .001, η_p^2 = .194.

Participation

There was no main effect of gender on participation, F (376) = 2.79, p = .096, η_p^2 = .007. There was a main effect of condition, F (376) = 41.23, p < .001, η_p^2 = .100, such that participants indicated significantly higher levels of participation in the feminine behavioral cues (vs. control) condition. The interaction did not reach statistical significance, F (373) = 3.28, p = .071, η_p^2 = .009. However, consistent with our predictions, simple effects analyses revealed that in the control condition, there was a gender gap where women (M = 4.20, SD = 1.61) indicated lower levels of participation than men (M = 4.69, SD = 1.40), F = 6.02, p = .015, η_p^2 = .016. In the feminine behavioral cues condition, the gender gap closes where women (M = 5.35, SD = 5.35)

and men (M = 5.33, SD = 1.09) indicated similar levels of participation, F = 0.01, p = .920, η_p^2 < .001. Alternative slopes, men indicated greater levels of participation in the feminine behavioral cues (vs. control) condition, F = 11.00, p < .001, η_p^2 = .029. Similarly, women indicated greater levels of participation in the feminine behavioral cues (vs. control) condition, F = 32.77, p < .001, η_p^2 = .081.

Study S2: Manipulating Cultural Default Study

We theorize that the gender gap in participation persists in business schools because it leaves in place masculine defaults. We examine this directly by manipulating the business school default (masculine vs. feminine) and predict that women will report lower levels of participation and inclusion than men in a business school characterized by masculine defaults, but not in one characterized by feminine defaults. This study's design, hypotheses, and analysis plan were preregistered prospectively, before data were collected: https://aspredicted.org/y2td-snhn.pdf

Method

Participants

We recruited 450 participants from Prolific Academic who indicated current student status to complete an online survey for $0.80. Following our pre-registration, we excluded two participants indicated they did not identify as man or woman and 38 who failed our attention check item. Our final sample was 413 participants (228 women, M_{age} = 27.36, SD = 8.48).

Procedure

Participants were randomly assigned to read about a fictional business school with a culture that was either characterized as a masculine default (n = 205) or feminine default (n = 208). Participants in the masculine default condition read:

Imagine that you are a student enrolled in a prestigious, high-ranking business school.

> The culture of the business school emphasizes values like: individual achievement, assertiveness, and taking bold actions as critical for success. The campus is highly competitive with a strong focus on strategic networking, personal career advancement, and uncompromising leadership. The business school is known for its rigorous curriculum and renowned faculty who challenge students to take risks. Students at this business school compete for a limited number of positions at top consulting jobs.

Participants in the feminine default condition read:

> Imagine that you are a student enrolled in a prestigious, high-ranking business school. The culture of the business school emphasizes values like: teamwork, empathy, and building meaningful relationships as critical for success. The campus is highly supportive with a strong focus on relationship building, collective success, and collaborative leadership. The business school is known for its comprehensive curriculum and renowned faculty who encourage students to consider multiple viewpoints. Students support one another so that everyone has the opportunity to secure top consulting jobs.

Following the manipulation, participants indicated the highlighted business school values. Next, participants indicated their anticipated inclusion and likelihood of participating as a student in a classroom at the business school. Lastly, they responded to demographics items.

Measures

Inclusion. Participants responded to the same four items as Study 2 in the main text, α = .939, M = 5.08, SD = 1.57.

Participation. Participants responded to the same four items as Study 2 in the main text, $\alpha = .877$, $M = 4.95$, $SD = 1.45$.

Results

Analysis Plan

We performed a series of 2 (gender: man vs. woman) × 2 (business school default condition: masculine vs. feminine) ANOVAs to examine the effects of gender, condition, and their interaction on participants' inclusion and participation.

Inclusion

There was a main effect of condition on gender, $F(410) = 9.68$, $p = .002$, $\eta_p^2 = .023$, such that women indicated significantly lower levels of inclusion than men. There was also a main effect of condition, $F(410) = 72.69$, $p < .001$, $\eta_p^2 = .151$, such that participants indicated significantly lower levels of inclusion in the masculine default condition than those in the feminine default condition. We did not find a significant interaction, $F(409) = 1.32$, $p = .252$, $\eta_p^2 = .003$. However, consistent with our predictions, simple effects analyses revealed that in the masculine default condition, there was a gender gap where women ($M = 4.19$, $SD = 1.71$) indicated lower levels of inclusion than men ($M = 4.79$, $SD = 1.75$), $F = 8.96$, $p = .003$, $\eta_p^2 = .021$. In the feminine default condition, this gender gap closes where women ($M = 5.56$, $SD = 1.14$) and men ($M = 5.84$, $SD = 0.99$) indicated similar levels of inclusion, $F = 1.95$, $p = .163$, $\eta_p^2 = .005$. Alternative slopes, men indicated greater levels of inclusion in the masculine default than feminine default condition, $F = 24.59$, $p < .001$, $\eta_p^2 = .057$. Similarly, women indicated greater levels of inclusion in the masculine default than feminine default condition, $F = 52.39$, $p < .001$, $\eta_p^2 = .114$.

Participation

There was a main effect of condition on gender, F (410) = 9.68, p = .002, η_p^2 = .023, such that women indicated significantly lower levels of participation than men. There was also a main effect of condition, F (410) = 72.69, p < .001, η_p^2 = .151, such that participants indicated significantly lower levels of participation in the masculine default condition than those in the feminine default condition. We did not find a significant interaction, F (409) = 3.14, p = .077, η_p^2 = .008. However, consistent with our predictions, simple effects analyses revealed that in the masculine default condition, there was a gender gap where women (M = 4.24, SD = 1.61) indicated lower levels of participation than men (M = 5.02, SD = 1.50), F = 16.41, p < .001, η_p^2 = .039. In the feminine default condition, this gender gap closes where men (M = 5.47, SD = 1.11) and women (M = 5.17, SD = 1.22) indicated similar levels of participation, F = 2.47, p = .117, η_p^2 = .006. Alternative slopes, men indicated greater levels of participation in the masculine default than feminine default condition, F = 4.90, p = .027, η_p^2 = .012. Similarly, women indicated greater levels of participation in the masculine default than feminine default condition, F = 26.05, p < .001, η_p^2 = .060.

Exploratory Analyses: Professor Gender as Moderator

Although professor gender was not a focal variable in our predictions, it is relevant to the phenomenon under study. Thus, we examined these interactions in both studies for completeness. Results are summarized in Table S6.

No Moderation of Professor Gender in Primary Models

Across Studies 1 and 2, professor gender *did not* significantly moderate the student gender × professor feminine cues interaction. See below for analyses and results of each study.

Exploratory Moderation in Study 1

Analysis Plan and Results

We conducted a student gender × professor feminine cues × professor gender interaction and did not find a significant three-way interaction on raw participation score, t (2996) = 0.31, p = .575, 95% [-0.43, 0.77].

We conducted a student gender × feminine cues × professor gender × classroom gender ratio interaction on raw participation score. We found a significant 4-way interaction: t (3806) = -2.98, p = .003, 95% [-23.91, -4.92]. Among high gender ratio classrooms, there was not a significant 3-way interaction, t (1429) = -0.30, p = .764, 95% CI [-0.80, 0.59]. Among low gender ratio classrooms, there was a significant 3-way interaction, t (1475) = 2.20, p = .028, 95% CI [0.33, 5.82]. These effects were based on severely limited data as it was driven by a single classroom session and could reflect idiosyncratic characteristics of a single professor. Thus, we do not interpret these findings further. See Table S5 for professor gender and classroom gender diversity cell counts.

Exploratory Moderation in Study 2

Although our experimental study was not designed to directly test professor gender effects, we explored the full extent of the gender relevant effects by using a measure that asked participants to report what gender they perceive the professor to be 371 indicated man, 81 indicated woman, 6 indicated other/nonbinary). We excluded those who indicated other/nonbinary from the 3-way interaction analysis because this category was too small to provide reliable estimates in higher-order interaction tests. Importantly, results were unchanged when we retained these cases by collapsing categories (“man” vs. “woman/other/nonbinary”).

Analysis Plan and Results

We conducted ANCOVA (student gender × feminine cues condition × professor gender interaction) predicting anticipated participation and it was not significant, F (1, 444) < 0.01, p = .986, 95% [-1.38, 1.41]. The direction of the effects was inconsistent with Study 1.

Discussion

Across both studies, these exploratory analyses do not provide strong evidence that professor gender systematically changes the effect of feminine behavior cues on the gender participation gap. The more consistent and robust finding across both studies is that higher professor feminine cues are associated with closing the gender participation gap overall.

Table S5

Professor Gender × Classroom Gender Diversity Cell Counts (Classroom Sessions)

Professor Gender	High Gender Diversity Classroom Sessions	Low Gender Diversity Classroom Sessions
Women Professors	5	2
Men Professors	35	39

Note. Values represent classroom session (N = 81). Two women professors and 23 men professors taught multiple sessions. Classroom gender diversity was split at the sample median (0.425).

Table S6

Studies 1 and 2: Results Summary of Exploratory Analyses Examining Professor Gender as Moderator

Study	Dependent Variable	Interaction Term	F-value	p-value	Findings (Direction/Patterns)	Notes on Sample Balance
1	Raw participation	4-way: Student gender × Feminine Behavioral Cues × Professor Gender × Classroom Gender Diversity	8.86	.003	Low gender diversity classrooms: Significant student gender × feminine behavioral cues × professor gender: Among men professors: *b* = -0.24, *t* = -1.71, *p* = .088 Among women professors: *b* = 2.83, *t* = 2.03, *p* = .042 High gender diversity classrooms: Nonsignificant student gender × feminine behavioral cues × professor gender: Among men professors: b = -0.24, *t* = -2.95, p = .003 Among women professors: b = -0.34, *t* = -0.99, p = .320	5 women professors: 2 in low gender diversity class sessions and 3 in high gender diversity class sessions
1	Raw participation	3-way: Student gender × Feminine Behavioral Cues × Professor Gender	0.31	.575	No significant 3-way interaction	
2	Anticipated participation	3-way: Student gender × Feminine Cues Condition × Perceived Professor Gender	<0.01	.986	No significant 3-way interaction	Perceived professor gender: 81 participants perceived professor as a woman and 371 as a man

Note. All professor gender effects were exploratory and not preregistered. Study 1 results should be interpreted with caution due to small number of women professors and highly unbalanced cells; one key cell (low gender diversity, relatively high feminine behavioral cues) comprised one single classroom taught by a woman professor. Study 2 showed no evidence of moderation by professor gender.