Feminine Defaults are Associated with a Reduction in the Gender Participation Gap in MBA Classrooms: 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 Responsiveness

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 (-1 = 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 = .018, t = 0.58, p = .563, 95% CI [-0.04, 0.08].

Student Speaking Confidence

We did not find a significant difference in speaking confidence between men or women, b = -.006, t = -0.23, p = .820, 95% CI [-0.06, 0.04].

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 1). 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), participation (M = 13.72, SD = 8.86).

Table 1

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 2 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 (-1 = women, 1 =

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

Table 2

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	.093	2.85	.004	0.03	0.16
Cold-Call	.255	1.68	.097	-0.05	0.56
Student Gender × Cold-Call	.098	1.83	.067	-0.01	0.20
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	.108	3.15	.002	0.04	0.18
Participation Learning	.202	1.40	.165	-0.09	0.49
Student Gender × Participation Learning	.049	0.95	.340	-0.05	0.15
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	.124	2.85	.004	0.04	0.21
Participation Performance	-.034	-0.22	.825	-0.34	0.27
Student Gender × Participation Performance	.009	0.17	.868	-0.10	0.11
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	.110	3.56	.000	0.05	0.17
Professor Contact	.236	1.52	.132	-0.07	0.54
Student Gender × Professor Contact	.064	1.17	.243	-0.04	0.17
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	.135	4.32	.000	0.07	0.20

Participation to Benefit Others	.182	1.21	.231	-0.12	0.48
Student Gender × Participation to Benefit Others	-.014	-0.27	.791	-0.12	0.09
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	.127	3.51	.000	0.06	0.20
Peer Evaluations	.058	0.40	.694	-0.23	0.35
Student Gender × Peer Evaluations	.007	0.14	.891	-0.09	0.11
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	.122	3.65	.000	0.06	0.19
Learning Goals	.005	0.06	.950	-0.16	0.17
Student Gender × Learning Goals	.012	0.39	.697	-0.05	0.07
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	.125	4.10	.000	0.07	0.18
Syllabus Warmth	.066	0.77	.442	-0.10	0.24
Student Gender × Syllabus Warmth	.010	0.33	.744	-0.05	0.07
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	.100	3.09	.002	0.04	0.16
Community	.179	2.21	.031	0.02	0.34
Student Gender × Community	.044	1.55	.121	-0.01	0.10
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	.100	2.32	.021	0.02	0.19
Team Grade	.001	0.52	.608	0.00	0.01
Student Gender × Team Grade	.001	0.86	.390	0.00	0.00
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	.070	1.40	.160	-0.03	0.17
Individual Grade	.001	0.53	.601	0.00	0.01
Student Gender × Individual Grade	.001	1.41	.157	0.00	0.00

Participation Grade					
Classroom Gender Diversity	-.019	-2.16	.034	-1.96	-0.08
Professor Gender	.502	2.08	.041	0.02	0.98
Student Gender	.107	2.31	.021	0.02	0.20
Participation Grade	.027	3.49	.001	0.01	0.04
Student Gender × Participation Grade	.002	0.59	.556	0.00	0.01

Note. Results from a 2-level mixed model using student gender (-1 = women, 1 = men) as a predictor on raw participation score as a function of the course syllabus coding variables controlling for professor's gender (0 = women, 1 = men) 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. To examine whether gender predicts participation, we conducted a 2-level mixed-effects linear regression analysis in which students were nested within class sessions using student gender (-1 = female, 1 = male) as a predictor, controlling for professor's gender (0 = female, 1 = male) and classroom gender diversity on the raw participation score measure. To examine how classroom culture moderates how gender affects participation scores, we conducted 2-level mixed-effects moderation analyses using classroom feminine default (mean-centered).

To examine whether gender predicts participation discrepancy scores, conducted an Analysis of Covariance (ANCOVA) using student gender (dummy-coded: 0 = woman, 1 = man) as a predictor. For our moderation analysis on participation discrepancy score, we conducted a 2 (student gender: women vs. men) by classroom feminine default (mean-centered).

Raw Participation

There was a gender gap in the number of participation instances such that men participated more than women, $b = .113$, $t = 4.55$, $p < .001$, 95% CI [0.06, 0.16].

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, men (vs. women) participated more than expected if all students participated equally, $b = .226$, $p < .001$, 95% CI [0.13, 0.32].

Moderator: Classroom Feminine Default

Raw participation score. We found a significant main effect of student gender such that men participated more than women, $b = .130$, $t = 5.09$, $p < .001$, 95% CI [0.08, 0.18]. There was a significant main effect of classroom feminine default such that conveying higher levels of feminine defaults was associated with less participation, $b = -.258$, $t = -2.57$, $p = .013$, 95% CI [-0.46, -0.06]. Importantly, we found a significant student gender × classroom feminine default interaction, $b = -.152$, $t = -4.27$, $p < .001$, 95% CI [-0.22, -0.08].

Consistent with our predictions, when professors' behaviors conveyed a relatively less feminine default (i.e., -1 *SD* below the mean of our classroom feminine default measure), there was a significant gender participation gap, where men participated more women, $b = .238$, $t = 6.45$, $p < .001$, 95% CI [0.17, 0.31]. In contrast, when professors' behaviors conveyed a relatively more feminine default (i.e., +1 *SD* above the mean of our classroom feminine default measure), there was no gender participation gap, $b = .024$, $t = 0.68$, $p = .498$, 95% CI [-0.04, 0.09].

Alternatively, among men, the association between classroom feminine defaults and participation was negative and significant, $b = -.410$, $t = -3.92$, $p < .001$, 95% CI [-0.62, -0.20]. Among women, there was no significant association between classroom feminine defaults and participation, $b = -.107$, $t = -0.33$, $p = .328$, 95% CI [-0.32, 0.11].

Participation discrepancy score. We found a significant main effect of student gender such that men (vs. women) participated more than expected if all students participated equally (i.e., higher participation discrepancy scores), $b = .125$, $t = 4.91$, $p < .001$, 95% CI [0.08, 0.18]. There was a no significant main effect of classroom feminine default, $b = .000$, $t = -0.01$, $p = .989$, 95% CI [-0.07, 0.07]. Importantly, there was a significant student gender × classroom feminine default interaction, $b = -.142$, $t = -4.19$, $p < .001$, 95% CI [-0.21, -0.08]. Specifically,

when professors' behaviors conveyed a relatively less feminine default, there was a significant gender participation gap where men had higher participation discrepancy scores than women (i.e., men participated more than what would be expected if all students participated equally than did women), $b = .462$, $t = 6.44$, $p < .001$, 95% CI [0.32, 0.60]. In contrast, when professors' behaviors conveyed a relatively more feminine default, there was no significant gender participation gap, $b = .060$, $t = 0.88$, $p = .380$, 95% CI [-0.07, 0.19].

Alternatively, among men, the association between classroom feminine defaults and the participation discrepancy score was negative and significant, $b = -.124$, $t = -2.78$, $p = .006$, 95% CI [-0.21, -0.04]. Among women, there was no significant association between classroom feminine defaults and participation discrepancy scores, $b = .019$, $t = 0.55$, $p = .546$, 95% CI [-0.05, 0.09].

Additional Covariates in Primary Analyses

We also included whether the course was quantitative and years since professor's bachelor's degree as covariates in our analyses as reported in the main text. 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 include 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 (effect-coded: -1 = 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 3 for summary of results.

Table 3

Effect of Student Gender on Participation Using Additional Covariates

	Raw Participation Score	**Participation Discrepancy Score**
Student Gender *(1 = man)*	.130*** [0.08, 0.18]	.260*** [0.16, 0.36]
Constant	1.642	-.004
Observations	*3155*	*3155*
R-Squared	.021	.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 *** $p < 0.001$

Table 4

Inter-Variable Correlations of Course Syllabus Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Classroom Feminine Default	--												
2. Cold-Calling Presence	-.109	--											
3. Participation for Learning	.079	.169	--										
4. Participation for Performance	-.190	-.072	-.082	--									
5. Encouraged Professor Contact	.110	-.263*	.299*	-.102	--								
6. Participation to Benefit Others	.165	.170	.623**	.037	.315**	--							
7. Peer Evaluation Presence	-.090	.124	.430**	.198	.075	.220	--						
8. Learning Goals Emphasis	.014	-.010	.321**	-.169	.325**	.030	.307**	--					
9. Syllabus Warmth	.009	-.120	.333**	-.170	.345**	.175	.333**	.694**	--				
10. Community Emphasis	-.014	.027	.242*	.237*	.236*	.145	.223	.264*	.184	--			
11. Team Grade	.185	.036	.066	.257*	.089	-.177	.317**	.016	.016	.416**	--		
12. Individual Grade	-.217	.261*	-.308**	.145	-.086	-.200	.077	.056	.178	-.288*	-.052	--	
13. Participation Grade	-.105	.367**	.088	.099	-.180	.021	.195	-.023	-.007	-.092	.235*	.246*	--

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