


Building gender inclusivity: disentangling the influence of classroom demography on classroom participation

Tina R. Opie¹  · Beth Livingston² ·
Danna N. Greenberg¹ · Wendy M. Murphy¹

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Abstract Despite increased attention on women in business, concerns abound regarding the extent to which business schools are creating inclusive learning environments that support the leadership development of both male and female students. Using an organizational demography lens, we investigate the interactive effects of student gender, faculty gender, and classroom demography on class participation. We focus on class participation as it is essential to students' overall learning and development especially concerning leadership. Our findings demonstrate that student and faculty demography interacts with context in unexpected ways to affect participation. Specifically, when women students are in the minority and have a female professor, they receive higher participation grades, particularly as class size decreases. The findings from this study have important implications for business school faculty and administrators as they work to build more inclusive learning environments which support all students' development as leaders.

Keywords Gender · Faculty · Participation · Demography · Diversity · Inclusion · Classroom

In 2011, the United Nations launched the PRME Working Group on Gender Equality in part to address ongoing concerns regarding gender issues in management education. Similar to STEM fields, business is a male-dominated field characterized by inequities throughout the business pipeline. This inequity starts with lower numerical representation of female business students and female faculty (PRME Working Group on Gender Equality 2011) and extends to lower pay for women once they are employed, as well as lower representation of women in corporate executive and board positions (Catalyst 2017). Thus, business education is the foundation for examining gender issues in the business field. The gendered norms of many business schools

✉ Tina R. Opie
topic@babson.edu

¹ Management Division, Babson College, Babson Park, MA 02457, USA

² University of Iowa, Management and Organizations, Iowa City, Iowa 52242, USA

can create barriers that advantage men and thereby make it more challenging for women students to find their voices and construct their leadership identities (Kelan and Jones 2010; Simpson 2006). Hence, this PRME working group has been focused on understanding the extent to which business schools perpetuate or ameliorate gender inequality and how management education can play a more equitable role in educating future leaders who will build more inclusive organizations (Flynn, Haynes and Kilgour 2016).

Concerns regarding gender inequality become particularly relevant when one considers how faculty interact in the classroom and engage class discussion to support students' learning. Regardless of whether a course is case-based, experiential, or project-based, class discussion remains one of the most frequently used "active learning" strategies in business schools (Dallimore et al. 2013). It is through the process of discussion and the exploration and integration of diverse perspectives that students learn how to advocate for their own view as well as adjust their perspectives in response to others (Hertenstein 1991). Through active participation, students learn how to communicate effectively by organizing their ideas and formulating arguments and counter arguments. In addition, students learn to synthesize diverse perspectives and to think critically about the topics being discussed (Davis 2009; Harrison 2008). As such, class discussion is central to students' learning and growth as leaders.

A challenge when using this pedagogical approach is that classroom interactions between students and faculty are situated in a societal context where men's voices frequently command greater power and influence than women's voices (Ashcraft and Mumby 2004; Brescoll 2011). Students enter the classroom with a lifetime of experiences enacting gender (Tatum et al. 2013). These gendered norms impact class dynamics and can hinder professors' efforts to build inclusive classroom cultures. Hence, it is important that we understand the extent to which these gender dynamics affect a professor's ability to cultivate inclusive classroom environments.

Organizational demography theory grounds our research as we investigate the influence of demographic diversity (i.e., both student and faculty gender) and classroom context (i.e., gender proportionality in the classroom and classroom size) on class participation in an undergraduate organizational behavior course. Using a quantitative methodology, we compare class participation across multiple sections of a course taught by either a male or female faculty member. Our findings help to understand how the interaction between faculty and student gender and classroom context affects the development of inclusive classrooms that fully support all students' learning.

Classroom participation, gender, and organizational demography

Classroom participation is a preferred pedagogical method in business school classrooms as it has a significant influence on students' learning and development (Dallimore et al. 2013). Participation is essential for helping students take ownership for their learning (Girgrin and Stevens 2005; Rocca 2010; White 2011). Students report they are more motivated and believe they learn better when they actively participate in class discussion (Fritschner 2000; Rocca 2010). While participation helps with information retention (Dallimore et al. 2008, 2010; Ewens 2000), it also helps students move beyond lower-level thinking of memorizing and understanding to engage in higher-level thinking of interpreting, analyzing, and applying material learned (Bain 2004; Bloom et al. 1956; Crossgrove and Curran 2008; Ewens 2000; Herrington et al. 2009). Class participation

positively impacts students' critical thinking skills, reflective thinking, and problem solving skills (Dallimore et al. 2008; Delaney 1991; Pepper and Pathak 2010).

Class discussion also provides students with the opportunity to practice and learn how to successfully engage in the type of discourse that characterizes the workplace (White 2011). Students who participate actively in the classroom have improved communication and teamwork skills relative to students who participate less (Armstrong and Boud 1983; Berdine 1986; Rocca 2010). Because of its impact on higher-level thinking, critical thinking, and self-reflection, classroom participation is also important for leadership development (Dallimore et al. 2008; Gilmore and Schnall 1996). Participation feedback from professors signals to students what is valued and rewarded in an organizational context (Bean and Peterson 1998; Rocca 2010).

Gender diversity and class participation

Unfortunately, research suggests that the benefits of class participation may be less pronounced for students who are in the minority (e.g., due to race or gender) in part because these students participate at lower levels than students in the majority (White 2011). Students in the demographic minority often feel their ideas are not as well-accepted or responded to by faculty or fellow students when compared with those students who are in the majority (White 2011). Hence, one of the challenges to building an inclusive classroom is that the classroom cannot be separated from the power and politics of identity that exist in wider society.

Gender dynamics, in particular, have been found to have a strong influence on class participation. Male college students are more likely to participate and view participation as important to their learning process relative to their female peers (Arbaugh 2000; Wade 1994). Male students are also more likely to voluntarily respond to questions than female students (Altermatt et al. 1998; Eddy et al. 2014). Faculty behavior and perception of participation is also impacted by gendered assumptions. Faculty are more likely to actively encourage or call upon male students in a discussion (Howe and Abedin 2013). Furthermore, faculty are more likely to elaborate upon or praise male students when they participate which has implications for students' views of whose voice is valued in the classroom (Arbaugh et al. 2010; Kelan and Jones 2010).

Organizational demography and class participation

To better understand the relationship between gender and participation, it has been suggested that research needs to look beyond student gender to also consider the moderating influence of contextual factors (Tatum et al. 2013). Individual and group behavior is affected by the context in which people are embedded (Dasgupta and Rivera 2008). Specifically, assumptions about appropriate behavior are activated based on the composition of the overall group (Tajfel and Turner 1986). The proportion of people sharing similar backgrounds (e.g., gender or ethnicity) affects attitudes, behavior, and well-being (Hoppe et al. 2014). In other words, the demography of the group is an important contextual factor that moderates the relationship between individual categorizations and outcomes (Joshi and Roh 2009), such as participation. As the classroom can be seen as an organization in which societal norms influence the dynamics that arise (Cohen 1976; Tatum et al. 2013), organizational demography provides an important theoretical lens for exploring the relationship between classroom participation and gender.

According to social categorization theory, people make categorizations based on attributes that are available or most salient, regardless of how task-relevant they may be (Tajfel and Turner 1986; Turner et al. 1987). These categorizations form the basis for in-group/out-group distinctions which affect behavior and outcomes in groups (Ethier and Deaux 1994; Tajfel and Turner 1986). Diversity research refers to readily apparent physical features including age, gender, and race/ethnicity as surface-level diversity (Harrison et al. 1998). Such surface-level categorizations are particularly important in the classroom context where students and faculty are likely to have limited information about one another and may respond to each other based on surface-level judgments.

Organizational demography also explores how individual characteristics are represented in the system structure and how the demography of a system affects individual behavior (DiTomaso et al. 2007; Joshi et al. 2010; Pfeffer 1983; Stewman 1988). The similarity/attraction paradigm establishes that perceptions of similarity are associated with positive expectations and, conversely, perceptions of dissimilarity are associated with conflicting attitudes, goals, and negative expectations (Byrne 1971). Individuals tend to be attracted to and build relationships with others who share similar attributes, also known as homophily (McPherson et al. 2001; Watts and Dodds 2007). Thus, when individuals find themselves around similar others, they tend to communicate more and are more confident. Conversely, when individuals are in the minority in diverse groups, they may be less comfortable communicating and breaking out of established roles (Gruenfeld et al. 1996; Harrison and Klein 2007; Rico et al. 2008). Gender roles have been found to be more stereotypical in organizations with lower proportions of women (Dezsö and Ross 2012; Ely 1995; Joshi and Roh 2009). In these contexts, women tend to be more deferential to men, to engage in less assertive behaviors, and to focus more on emotional and relational concerns than on work tasks (Ely 1995). Relative to the classroom, this would suggest that the gender composition of the class will affect both student and faculty behaviors.

Organizational demography also reinforces the need to look at multiple factors when considering the relationship between gender diversity and class participation. Brady and Eisler (1999) suggest that we need to consider how student identity, faculty identity, and classroom context interact to affect participation. Unless these factors are examined simultaneously, it will be difficult to provide faculty with guidance on how to build a more inclusive class climate (Crombie et al. 2003; Frisby and Martin 2010; Rocca 2010). Furthermore, research needs to broaden beyond identifying the influence of demographic differences on participation to develop a strong theoretical paradigm that can be used to respond to the barriers that these differences may create for the modern classroom (Gupta et al. 2009).

A demography-based approach to participation

Social categorization and similarity/attraction theory suggest that there are distinct psychological factors that inform how gender is likely to influence class participation. Gender appropriate behaviors are prescribed by stereotypical social roles whereby women are expected to be warm, nurturing, and supportive (Abele and Wojciszke 2007; Cuddy et al. 2008; Diekmann and Eagly 2000; Eagly 2007; Eagly and Karau 2002). In contrast, men are expected to be extroverted, assertive, and competitive, particularly in professional contexts like the business classroom (Bowles et al. 2007; Prentice and Carranza 2002; Rudman et al. 2012). Classroom participation requires assertiveness and willingness to speak in a group, both counter-

stereotypical behaviors for women. Thus, it is not surprising that male students, as compared to female students, are more likely to raise their hands, speak for longer periods of time, interrupt fellow students, and take over leadership roles in team projects and small group exercises (Allan and Madden 2006; McCabe 2009; Rankin and Reason 2008). In addition, professors are more likely to call on and give credit to male students and provide them with more verbal affirmation and direction relative to female students (Tatum et al. 2013). These behaviors are likely due to social categorization resulting in implicit gender biases, which render women as less agentic, more communal, and more deferential than their male counterparts (Rudman and Phelan 2008). Thus, we expect that:

H1: Female students will have lower levels of class participation than male students.

Similarity/attraction theory also suggests that students may be more engaged and feel more positive in a class where they experience gender similarity with the professor. This explains why female students are more likely to choose a female professor as their best professor and male students are more likely to choose a male professor (Basow 2000). Findings from studies in primary and secondary education show that when teachers' gender, race, or ethnicity match that of their students', student interaction may increase and teachers' subjective evaluations of student performance may be higher (Downey and Pribesh 2004; Ehrenberg et al. 1995; Karp and Yoels 1976). As a course progresses, female students are more likely to ask for help from female professors than they are from male professors (Stout et al. 2011). Overall, demographic similarity affects how both students and faculty engage in a class, such that:

H2: Student gender will interact with faculty gender such that students in a class with a same gender faculty will have higher class participation.

Similarity/attraction theory also suggests that the proportion of similar others will affect the extent to which women are comfortable engaging in non-stereotypical behavior. The proportion of similar students is likely to be as salient to a student as the demographic similarity of the faculty member leading the class (cf., Joshi et al. 2006). In fact, when female students are in the minority, they are less willing to raise their hands, to answer questions, and to contribute to class discussions (Canada and Pringle 1995; Czekanski and Wolf 2013; Tatum et al. 2013). In academic disciplines that are predominately male (e.g., engineering and business), gender balance has been found to affect female students' sense of belonging and their subsequent desire to participate (Murphy et al. 2007). In addition, when female students do participate in this context, they provide shorter and less comprehensive answers which means their contributions are less influential to class discussion (Comelius et al. 1990). This research suggests:

Hypothesis 3a: Gender proportionality will moderate the relationship between gender and class participation such that women in classes with a higher proportion of women will have higher participation than women in classes with a lower proportion of women.
Hypothesis 3b: Gender proportionality will moderate the relationship between gender and class participation such that men in classes with a higher proportion of men will have higher participation than men in classes with a lower proportion of men.

Class gender balance is also likely to affect professors' behavior. Specifically, when the proportion of male students increases, faculty offer less praise and follow up less on comments

(Canada and Pringle 1995). This change in behavior means that as the percentage of male students increases, faculty may be unconsciously structuring class discussion such that it is more supportive of male communication patterns (Sinclair 1995). In fact, past research has shown that the gender balance of a class is a significant predictor of both student and faculty behaviors (Tatum et al. 2013). Thus, we expect that the interaction between the class context, as represented by the gender proportionality of the class, and the gender of the professor will affect individual student participation, such that:

H4: Gender proportionality will interact with faculty gender to affect participation such that women in classes with a higher proportion of women and a female faculty will have higher participation than women in classes with a lower proportion of women.

Finally, we consider the influence of class size on the relationship between gender and participation. Group size is known to influence individual and group interactions (Brewer and Kramer 1986). Gender salience is also affected by group size (Randel 2002). As class size decreases, gender becomes increasingly salient to the self because of numerical distinctiveness (Pichevin and Hurtig 1996) such that an infrequent demographic category is rendered more salient (McGuire and McGuire 1981). This salience can have a positive effect on those in the minority as they feel more empowered and supported by the other minority group members. This perspective suggests that as class size decreases and the proportion of female students increases, female students are likely to participate more frequently (Canada and Pringle 1995). Thus, we expect that the interaction described in Hypothesis 4 will be moderated by classroom size. We posit that this effect will be particularly strong when there is a female faculty based on demographic similarity. Therefore, we hypothesize:

Hypothesis 5: Classroom size will interact with faculty gender and gender proportionality to affect participation such that women in smaller classes with a higher proportion of women and a female faculty will have higher participation than women in larger classes with a lower proportion of women.

Methods

Research setting

This study was conducted with undergraduate business school students at a small, highly selective stand-alone business school in the USA. The only degree granted to undergraduate students is a Bachelor's of Science in Management. Women comprise 47% of the entire undergraduate student population which is slightly above the US national average of 43% (Flynn et al. 2016).

The setting for this study was a required organizational behavior course which is taught in the second year of the undergraduate program. This course is coordinated such that all 12 sections use the same texts, cases, and in-class exercises. For every class session, detailed teaching notes and slides are used by the faculty to create consistency across sections. Furthermore, deliverables and grading points are identical, including individual exams and papers, a team project, and in-class activities. This consistency across the curriculum creates an ideal research setting for comparing the effects of student and faculty gender and class context.

As scholars of gender and diversity, we believe it is important to consider how our own identities informed the research process. For all researchers, being cognizant of the influence of the researchers' personal histories and social identities can enhance the rigor of the research methodology (Barry 2015; McCorkel and Myers 2003; Rice 2009). All four researchers are married mothers who identify as women. Three of the researchers are White and one is Black. The researchers are at the assistant, associate, and full professor level and all four are pursuing research agendas that connect to gender and diversity in organizations. Finally, three of the researchers are affiliated with the university where the research was conducted and one of the researchers is affiliated with a different university. Our engagement with this research has been influenced by our shared gender and role identities. Because of our role and gender identities, we have found ourselves more attuned to class participation differences between male and female students. As women faculty, we also find that female students frequently seek our advice regarding concerns about class participation as well as about their differing experiences with male versus female faculty. We do not find that our female students are as quick to discuss these issues with our male colleagues. We believe our gender and role identities likely affected how we have framed this study with a focus on the interaction effect of faculty gender and student proportionality.

We also believe our institutional affiliations helped us manage potential biases with this research. As three of the researchers were affiliated with the institution in which the research was conducted, their insider knowledge helped develop a more nuanced interpretation of these findings (Bartunek and Louis 1996). However, having one researcher who was an outsider to this institution enabled her to question the insiders' knowledge and act as a devil's advocate as the researchers were interpreting these findings. As others have noted this, insider-outsider dichotomy can be valuable for managing issues of research subjectivity (Mayorga-Gallo and Hordge-Freeman 2017). Overall, we believe that the intersection between our shared and varied identities has supported us in developing a more nuanced and valid exploration of the relationship between gender diversity and class participation.

Class participation

In this course, class participation was a major focus as it enhanced student engagement and learning. Too often, class participation is determined by who raises their hand the most rather than who provides substantive, insightful points. To help students understand that participation is about substantive contributions and not about hand raising, the faculty created a rubric that defined what was considered high-quality participation and how it would be evaluated (see "Appendix"). As others have noted, a rubric is helpful for creating clear expectations and building consistency and fairness into the grading process (Abuid 2014; Bean and Peterson 1998; Marshall 2010). A rubric can also help reduce biases and build greater reliability into participation evaluation (Bean and Peterson 1998; Howell 2011; Riddle et al. 2016).

In creating this rubric, the faculty used language that encouraged participation that supported higher-level thinking (Bloom et al. 1956). Participation that was focused on analyzing, evaluating, and creating new ideas was defined as making a stronger contribution and graded higher than lower-level participation that was centered on remembering and defining concepts. If a student participated frequently but only provided lower-level contributions, they did not receive a top participation evaluation for that class session. Relying on the rubric meant that a higher participation grade was indicative of responding to higher-level questions or

introducing higher-level ideas as opposed to participating frequently or only responding to lower level questions.

This rubric was introduced at the start of the semester to explain to students why participation is important and how it connects to their learning. Halfway through the semester, students were invited to self-reflect on their participation using the rubric. Faculty reviewed these reflections and provided students with feedback.

The faculty used the same four-point rubric to assess participation. Following each class session, faculty were expected to use the rubric to record each student's participation. At the end of the semester, faculty calculated final participation grades based on the averages from these daily records. The four-point scale was then converted to a 100-point numeric grade which counted 20% towards students' final grades (see "[Appendix](#)").

Participants

Participants in this study were 411 undergraduate students enrolled in 12 sections of the core organizational behavior course. Forty-three percent of the students identified as female and 57% of the students identified as male. Students self-identified their race/ethnicity as White (43%), International (26%), Asian (11%), Hispanic (9%), Black (4%), Multi-cultural (1.5%), and Native American (0.2%) with the remaining not identifying. Seventy-four percent of the students indicated that they had domestic (versus international) status. Sixty-four percent of students indicated that English is their primary language, with Spanish (12%), Chinese (5%), Korean (4%), and French (2%) being the next largest categories.

It is important to note that our research team initially sought to take an intersectional approach in order to gain a more nuanced understanding of the relationship between classroom demography and classroom participation (Crenshaw 1991; Jones et al. n.d.). However, faculty homogeneity prevented us from using this approach. For example, only one of the faculty members was Black with no other faculty of color and all of the faculty were from the USA.

The researchers gathered final participation and course grades from the professors and demographic data from the registrar's database. The information was matched via a confidential student identification number provided by the registrar's office to ensure the research team was unaware of students' identities. Faculty demographic data were also added to the database. Notably, data were collected post hoc, so faculty were unaware of the study beforehand and IRB approval was obtained before the database was created.

Measures

Student class participation Participation was measured using the numeric faculty grade assigned to a student for class participation. These grades are based on evaluation of student participation using the aforementioned rubric. Numeric grades were on a 100-point scale ($M = 86.3$, $SD = 6.31$). This is our dependent variable and thus is measured at the *individual student* level of analysis.

Student gender We assigned a dummy code of 0 to female students and 1 to male students. Again, 43% of the students identified as female and 57% identified as male. Although we understand that gender is most appropriately conceptualized as a continuum (as individuals

identify as transgender, gender non-conforming, and gender queer), due to data availability limitations, gender was based on a binary measure of male or female as identified by students at the time of enrollment and noted by the registrar's office. This was a measure at the *individual student* level of analysis.

Student gender proportionality Following Williams and Mean (2004) and Hoppe et al. (2014), we operationalized gender proportionality for each student by calculating the proportion of students in a class section who are of the same gender as the student (i.e., proportional similarity). For example, if a class section consists of 49 females and 51 males, each female in that section has a gender proportionality of 0.485 (48/99) because 48 other females are among the 99 classmates. For the males, 50 of the 99 classmates are of the same gender; thus, gender proportionality is 0.505 for each male in that section. Gender proportionality scores ranged from 0.13 to 0.81. This is a measure at the *classroom* level of analysis.

Faculty gender We assigned a dummy code of 0 to female faculty and a 1 to male faculty. Eight sections were taught by female faculty and four sections were taught by male faculty. This is a measure at the *classroom* level of analysis.

Classroom size The number of students in each class section was counted ($M = 34$, $SD = 7.19$). This is a measure at the *classroom* level of analysis, entered as a statistical control variable.

Student GPA The registrar provided each student's GPA. This was entered as a covariate as GPA has been found to be correlated with participation (Galyon et al. 2012) ($M = 3.04$, $SD = .474$). This is a measure at the *individual student* level of analysis, entered as a statistical control variable.

Results

Table 1 reports the descriptive statistics and intercorrelations for all variables. To test our hypotheses related to the influence of student gender, student gender proportionality, faculty gender, and classroom size, we regressed individual student participation scores on our gender-related variables, and their interactions, with student GPA and class size as control variables.

Table 1 Correlation matrix of all study variables ($N = 411$)

Variables	Mean	SD	1	2	3	4
Student GPA	3.04	0.47				
Student gender	0.57	0.50	-0.09			
Student gender proportionality	0.53	0.15	-0.06	0.46**		
Faculty gender ¹	0.29	0.46	0.01	-0.10	0.02	
Class participation	86.30	6.31	0.44**	0.00	0.01	0.02

** $p < 0.01$

¹ Student gender and faculty gender were coded 0 for female, 1 for male

Because each student was nested in a class section, we performed multilevel regression. Initial proportion of variance checks (random ANOVA models; Raudenbush and Bryk 2002) using Stata 14.2 xtreg demonstrated that 3% of the variance in the dependent variable was explained by level 2 variance. Given the proper structure of the data, we ran all of our analyses using xtreg (a multilevel analysis) which accounts for the shared variance among students nested within sections.

As shown in Table 2, Hypothesis 1 predicted that female students would have lower participation grades than male students. Student gender was not a significant predictor of class participation grade ($\beta = 0.46, p > 0.05$). Thus, Hypothesis 1 was not supported.

Hypothesis 2 predicted that faculty gender would moderate the relationship between student gender and participation. There was no significant interaction between student gender and faculty gender ($\beta = 0.30, p > 0.05$). Thus, Hypothesis 2 was not supported.

Hypothesis 3 examined whether student gender proportionality moderated the relationship between student gender and class participation. There was a significant interaction ($\beta = 10.08, p < 0.05$). Specifically, male students received higher class participation evaluations as the proportion of male students increased. This effect was not found for female students. Thus, Hypothesis 3a was not supported while Hypothesis 3b was supported (see Fig. 1).

Hypothesis 4 predicted a three-way interaction between student gender, student gender proportionality, and faculty gender. There was a significant interaction ($\beta = -30.34, p < 0.001$), but it was in the opposite direction from what was hypothesized. We followed procedures outlined by Dawson and Richter (2006) to probe the significant three-way interaction. While the slopes for male faculty did not significantly differ $t(411) = (n.s., p > 0.05)$, slope difference tests indicated that all other slope differences were statistically significant. Pertaining to H4, the slope for female faculty and male students differed significantly from the slope for female faculty and female students; $t(411) = 3.27, p < 0.001$. For male students with female faculty, there was a positive relationship between gender proportionality and participation: as gender proportionality increased, participation increased (see Fig. 2); the opposite was found for female students with female faculty.

Finally, we examined how class size might moderate this effect (Hypothesis 5). Specifically, we included a four-way interaction between student gender, faculty gender, gender proportionality, and class size. Class size is significantly related to participation grade. According to the correlation table, students are more likely to get better participation grades in larger classes ($r = 0.11, p < 0.05$). We also found a significant four-way interaction ($B = 8.92, p < 0.01$; see Table 3).

To probe this interaction to determine whether it confirms our hypothesis, we ran the same three-way interaction analyses in two groups, based on a split of class size (range = 17:40, $M = 34, SD = 7.19$). We find that the hypothesized three-way relationship tested in Hypothesis 4 was confirmed for smaller classes ($B = -55.34, p < 0.01$) but not for larger classes ($B = -2.82, p > 0.05$) (see Fig. 3; the graph for larger classes was not plotted because the coefficient was not statistically significant). This relationship mirrors exactly the overall interaction that we found in the sample, and slope difference tests again revealed that the slope for female faculty and male students differed significantly from the slope for female faculty and female students; $t(105) = 4.07, p < 0.001$. Again, for male students with female faculty, there was a positive relationship between gender proportionality and participation: as gender proportionality

Table 2 Summary of multilevel regression analysis for variables predicting class participation ($N = 411$)

Variable	Model 1			Model 2			Model 3		
	<i>B</i>	SE <i>B</i>	95% CI	<i>B</i>	SE <i>B</i>	95% CI	<i>B</i>	SE <i>B</i>	95% CI
Controls?				Yes			Yes		
Independent variables									
Student gender (level 1)	0.46	0.64	(-0.81, 1.72)	-0.10	0.96	(-1.98, 1.77)	0.65	0.97	(-1.25, 2.55)
Faculty gender (level 2)	0.20	0.62	(-1.01, 1.41)	0.54	1.05	(-1.52, 2.60)	1.64	1.09	(-0.48, 3.77)
Student gender proportionality (level 2)	0.91	2.09	(-3.19, 5.02)	0.13	4.22	(-8.14, 8.39)	-9.13	4.50	(-18.92, 0.66)
Interaction terms									
Student gender × faculty gender				0.30	1.40	(-2.45, 3.05)	-0.35	1.40	(-3.09, 2.39)
Student gender × student gender proportionality				10.08*	4.58	(1.10, 19.06)	24.96***	6.47	(12.54, 37.38)
Faculty gender × student gender proportionality				-11.64**	4.46	(-20.39, -2.89)	7.01	7.10	(-6.91, 20.93)
Student gender × student gender proportionality × faculty gender							-30.34	9.07	(-48.11, -12.57)

* $p < 0.05$

** $p < 0.01$

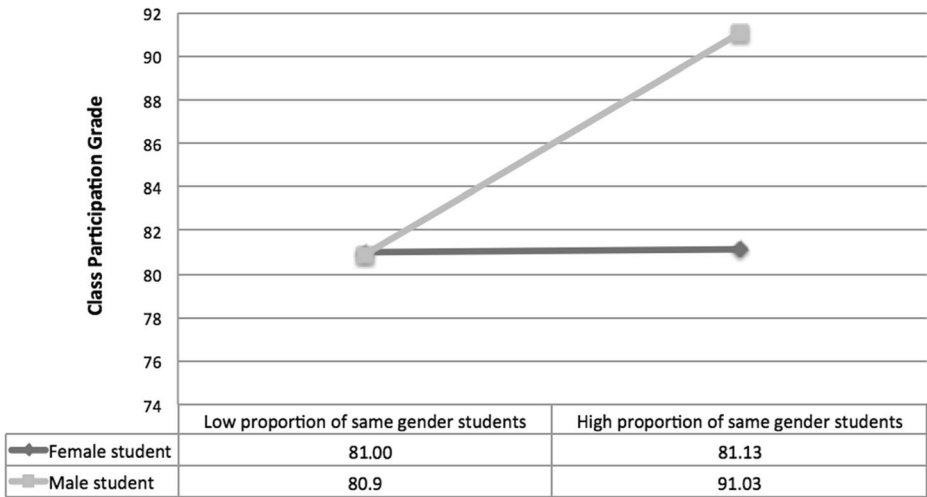


Fig. 1 The influence of student gender and student gender proportionality on participation. Low and high proportionalities are graphed at ± 1 SD

increased, participation increased. We again found the opposite for female students with female faculty.

Discussion

Gender equality continues to be at the forefront of conversations on how to create more inclusive learning environments in higher education, particularly in male-dominated fields such as STEM and business. Given the importance of class participation to students’ learning and development, participation remains a central pedagogical tool

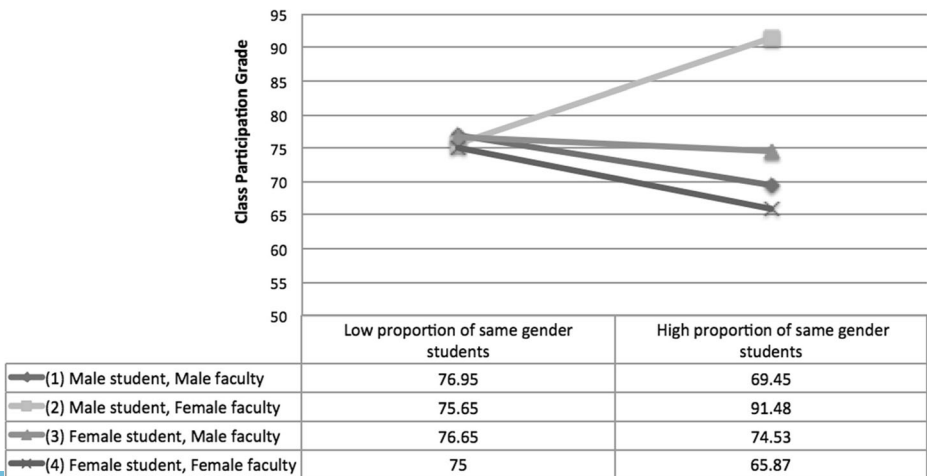


Fig. 2 The influence of student gender, faculty gender, and student gender proportionality on participation. Low and high proportionalities are graphed at ± 1 SD

Table 3 Multilevel regression for Hypothesis 5 including class size ($N=411$)

Variable	<i>B</i>	SE <i>B</i>	95% CI
Student GPA (level 1 control)	6.22**	0.59	5.06, 7.37
Class size (level 2)	0.57	0.37	-0.16, 1.31
Student gender (level 1)	0.09	2.29	-4.39, 4.57
Faculty gender (level 2)	-0.96	2.33	-5.53, 3.61
Student gender proportionality (level 2)	8.59	11.41	-13.77, 30.95
Student gender × class size	-0.01	0.41	-0.83, 0.80
Class size × student gender proportionality	4.26	2.38	-0.41, 8.93
Faculty gender × class size	-0.46	0.43	-1.31, 0.38
Student gender × faculty gender	-0.50	3.10	-6.58, 5.57
Student gender × student gender proportionality	-10.21	13.31	-36.29, 15.88
Faculty gender × student gender proportionality	-16.07	15.22	-45.92, 13.77
Student gender × class size × faculty gender	7.71	20.75	-31.97, 48.38
Student gender × student gender proportionality × class size	-9.13**	3.11	-15.24, -3.03
Class size × student gender proportionality × faculty gender	-4.31	2.48	-9.18, 0.56
Student gender × class size × faculty gender	-0.08	0.50	-1.05, 0.89
Student gender × student gender proportionality × faculty gender × class size	8.93**	3.25	2.56, 15.29

* $p < 0.05$

** $p < 0.01$

and thereby greatly influences class inclusivity. In analyzing the relationship between gender diversity and class participation, we found no significant difference between male and female students' class participation nor did we find faculty-student gender similarity affected this relationship. However, we did find an interesting influence when class context was taken into consideration. Similar to previous research, we found that male students had higher class participation grades the higher the proportion of men in the class (Czekanski and Wolf 2013; Tatum et al. 2013). We also found an unexpected interaction between student gender, faculty gender, and gender proportionality. Specifically, when female students are in the demographic minority and have a female faculty,

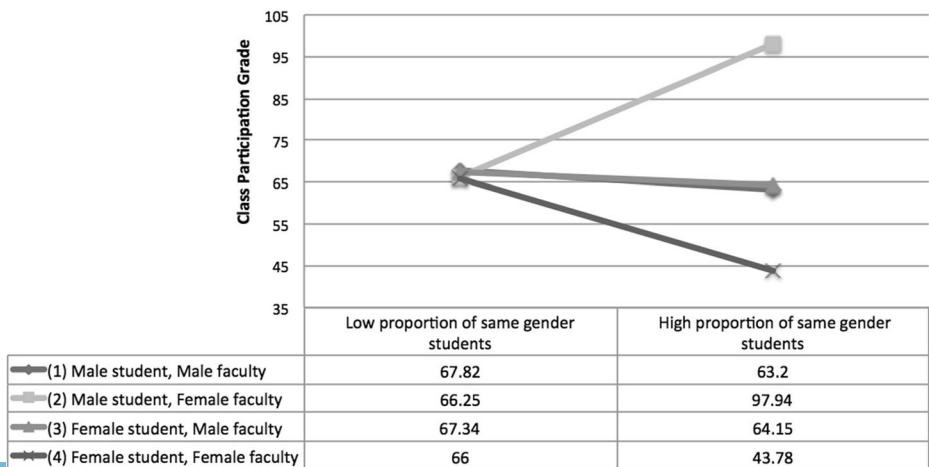


Fig. 3 The influence of student gender, faculty gender, and student gender proportionality on participation, in small classes. Low and high proportionalities are graphed at ± 1 SD

female students' participation is higher. This interaction effect is particularly strong when class size is small. No parallel effects were found for male students or when a course was taught by a male faculty. By examining the influence of faculty and student gender in conjunction with class demography, these findings provide nuanced insight into the relationships between gender diversity and class participation.

Implications for building gender equity in higher education

In response to the increased scrutiny on closing the gender gap in business schools, many schools have focused on cultivating a more diverse student body (Flynn et al. 2016). While increasing the representative numbers of female students is one step towards creating gender inclusivity, our findings suggest that focusing on numerical representation alone is insufficient to build an inclusive learning environment (Ma 2011). The findings from this research show the importance of considering other exogenous factors, namely faculty gender and class size, when considering how to build gender-inclusive learning environments.

Relying on organizational demography to frame this study draws attention to the complex dynamics that may be underlying the relationship between gender and class participation. Not finding a significant direct effect between gender and class participation, in conjunction with finding an interaction effect between student gender, faculty gender, and student gender proportionality and class size on class participation, indicates that the class structure and demography may play an important role in influencing how faculty and student behavior and learning are impacted by gender. Below, we discuss psychological factors (i.e., similarity/attraction paradigm, minority spotlighting, and gender minority empowerment) that may be contributing to the effect that class context and faculty gender have on the relationship between student gender and class participation.

From an organizational demography perspective, these findings may be connected to the similarity/attraction paradigm. As was discussed in the literature review, the similarity/attraction paradigm establishes that perceptions of similarity are associated with more positive expectations and individuals tend to be attracted to and build relationships with others who share similar attributes (McPherson et al. 2001). In a small classroom where women are in the minority, female students and female faculty may be more cognizant of their gender similarity. This may result in an unconscious responsiveness on the part of female faculty to their female students and on the part of female students to female faculty. In this context, female faculty and students may shift their behavior due to this similarity. Because of this similarity, female faculty may also perceive female students' participation as more significant than it really is. This is consistent with research that shows that demographic identity similarity between faculty and students can result in perception biases of students' performance (Downey and Pribesh 2004; Ehrenberg et al. 1995). This would help explain why female students' participation grades were higher in this context.

Alternatively, when male students are in the majority, male students tend to receive higher participation scores when they have female instructors than when they have male instructors or are in a more gender-balanced classroom context. In this case, it may be a

case of “squeaky wheel” gets the grease, as men who are surrounded by other men can often enact competitive and dominant behaviors (e.g., Niederle and Vesterlund 2007). We know that in general, men participate more in class than women (Caspi et al. 2008), and it is possible that this phenomenon is exacerbated when men are surrounded by other men. Further, this effect among males was heightened as class size decreased. The smaller number of students may make any competition for attention more likely, as (a) the ratio of male to female students is more noticeable and (b) one can more readily achieve attention for one’s classroom participation. Additionally, previous research suggests that female students engage in more silencing behavior and are less willing to speak out when they are in a more male-dominated classroom and are more aware of the presence of males (Canada and Pringle 1995; Tatum et al. 2013). Thus, these findings may also be a result of female students participating less which leads faculty to perceive that male students are participating more.

This further highlights that the effect of faculty gender and class context on student’s class participation may also be emerging due to the way in which female faculty behavior and perception shifts when teaching a smaller class with women in the minority. In a smaller class, female faculty may be more aware of female students being in the minority and thereby more likely to engage in behaviors that are directed at helping their female students. Minority spotlighting refers to actions taken by an individual that single out another person because of their identity (e.g., gender or race) with the intention to harm or help (Andrews 2012; McLoughlin 2005). While we frequently think of minority spotlighting as being done by a member of the majority (in this case, male faculty), our findings suggest that female faculty may be engaging in spotlighting of female students when they recognize their minority status, which may be more likely in a small class. When female students are more clearly in the minority, female faculty may be more cognizant of and responsive to their female students in and out of the classroom. In this context, female faculty may call on female students more frequently, which would lead to higher participation than when these students are in larger classes. This is consistent with prior research, which has shown that female faculty who are focused on gender equity in the classroom engage in behaviors that increase the participation of female students (Roth 1996). At the same time, if female faculty are more aware of female students in the classroom, they may perceive their participation as higher than it really is. In other words, minority spotlighting may also lead female faculty to unconsciously be more positive in their perception of who is participating and at what level.

Finally, the relationship between class context and gender similarity on class participation may also be a result of how female students’ behavior and empowerment changes in this context. In a larger class, female students may not feel the subtle difference in behavior that results from being in the minority (Crombie et al. 2003). However, when in the minority in a small class, female students may be more attuned to differences in gender ratio. With this awareness and the support of a female faculty member, female students may be more empowered to break typical gendered expectations and participate more. This perspective is supported by research which suggests that women are more likely to participate in a class environment where they feel comfortable (Ely et al. 2011; Salter and Persaud 2003). The demographic effect of a

smaller class with few women but with a female professor may be providing female students with the comfort they need to take risks and make stronger contributions to class discussion.

While some faculty may believe the “glass ceiling” has been shattered and that gender biases are no longer impacting management education (Flynn, Cavanagh, and Bilimoria 2016), our findings suggest that the effect of gender biases on learning and teaching is not shattered. Rather, this effect may be much more subtle and complex than previously considered. Faculty need to be more conscious of their own implicit biases, of the assumptions they are making about students, and how these assumptions may be affecting their behavior in the classroom as well as their perceptions of students’ behavior in the classroom. Recognizing and challenging faculty biases is an essential, and often overlooked step, in developing more inclusive learning environments.

Faculty also need to take action to help students manage how gender biases and gender norms may be affecting their participation. One way for faculty to make inclusive learning norms more explicit to students is to integrate these into expectations around behavior and evaluation in the classroom. We believe that the participation rubric used in this research setting may partially explain why we did not find a direct effect of gender on class participation as some prior research might suggest (e.g., Diekmann and Eagly 2000; Eagly and Karau 2002; Prentice and Carranza 2002). The participation rubric describes participation expectations in detail and is designed to help students understand that valuable contributions to discussion can be made in diverse ways. The rubric also highlights the difference between quality and quantity of participation and it helps correct students’ biases that emphasize a stereotypical masculine style of participation, which favors competition and aggression (Simpson 2006). Sharing a formalized class participation rubric with students may be one way for faculty to develop evaluation criteria that reinforce a more inclusive model of participation. While other researchers have noted the value of a participation rubric for improving faculty grading (i.e., Bean and Peterson 1998; Hollander 2002), we are suggesting that a rubric may also be useful for improving how students engage in discussion and how that discussion is used to build an inclusive climate.

Limitations and future research

Like all research, this study has limitations which warrant future research. The first limitation relates to generalizability. This study was conducted at an undergraduate business school where students can only major in business. In addition, this college had undertaken numerous initiatives to build a more gender-inclusive learning environment. Both of these factors may hinder the generalizability of our research and suggest the need for research across diverse contexts of higher education.

A second limitation stems from the measurement of and singular focus on gender in this study. Pertaining to measurement, gender is a complex identity as gender identity occurs on a continuum with students increasingly identifying as transgender, gender non-conforming, and gender queer. Individuals also differ in the degree to which they identify with their gender and perceive gender to influence their experiences. Future research would benefit from exploring gender identity rather than biological sex and considering strength of gender identification. In addition, gender is just one of a multitude of social identities that can affect classroom experience, learning, and performance (Ong et al.

2011). Future research needs to explore the intersection between gender and other identities such as race, ethnicity, religion, and sexual orientation and the effect on class participation. To date, there have been few studies that look at the interaction effect between gender and these other social identities on student participation and performance (Eddy et al. 2014).

This paper is also limited by the use of a single measure to assess participation. While the use of a rubric to evaluate students increases the reliability of this measure, a graded item does have the potential for faculty biases. Other participation research has relied on students' self-reporting or external observations of a few classes to measure participation (Dallimore et al. 2013; Dallimore et al. 2006). As these measures also have biases, future research may benefit from considering multiple measures of participation such as self-reported data, external observation, and faculty assessments of participation.

The use of a single measure to evaluate participation also does not enable this research to explore the more nuanced relationship between gender and participation. For example, gender may be leading to differences in how students participate. Prior research has found that male students voluntarily respond to questions more frequently than female students (Altermatt et al. 1998; Eddy et al. 2014). This suggests the need to consider both voluntary and involuntary participation as well as the different types of contribution made by students. Research also needs to explore how faculty's behavior may differ when interacting with students around participation. For example, faculty have been found to be more likely to call on male students than female students (Howe and Abedin 2013) and to ask male students to answer higher-order questions (Scantlebury and Kahle 1993). Understanding the subtle ways in which faculty behavior may be influenced by gender biases is important to changing behavior in order to build a more inclusive learning environment.

A final limitation is our sample size. While this study was conducted with a large number of students ($n = 411$ students), only 12 different course sections were considered. Although there was enough variation in participation at the student level, the small number of sections in the sample may limit the insights of our findings. However, because of the consistency across the sections concerning class content generally and evaluation and use of participation specifically, this setting provided a unique opportunity to consider the effect of classroom demography on participation. Future research might benefit from studying a larger number of class sections while keeping class pedagogy consistent.

Conclusion

Colleges and universities are not just places where students learn the conceptual and interpersonal knowledge and skills needed to be leaders; they are places where students begin to define who they want to be as a leader and how they want to engage with a diverse world and community. To help students develop in this capacity, educators need to focus on how they teach along with what they teach. Creating a classroom where students can find their voice and can be recognized for their unique contributions, regardless of faculty or student gender or classroom demography, is essential for creating an inclusive learning environment. It is our hope that this paper contributes to a larger collective effort towards greater gender inclusivity in higher education.

Appendix

GRADING RUBRIC

This document provides detailed behavioral examples to understand the difference between outstanding, good, average/fair, and poor participation. Class participation is based upon four dimensions: preparation, participation, interaction with colleagues, and professional conduct.

Outstanding Participation (4)

Your contributions reflect exceptional critical thinking and analysis related to the course material. You are fully prepared, listen closely to both the professor and your classmates, and your contributions provide major insights and new directions for discussion. If you were not a member of the class, the quality (not quantity) of class discussion would be significantly diminished.

- **Preparation**
 - Easily discusses assigned reading without needing to reference material
 - Critically thought about reading and developed your own ideas related to reading
- **Participation**
 - Contributes at critical junctures in the discussion that introduce new insights
 - Makes relevant connections between current session and class discussions/other streams
 - Analyzes and synthesizes material doesn't just repeat data
 - Draws on personal experience and opinion that is relevant to discussion
 - Takes on a leadership role in class/group exercises
 - In almost every class makes contributions that reflect critical thinking and analysis
- **Interaction with colleagues**
 - Constructively brings in differing views, ideas that challenge others' thinking
 - Demonstrates excellent listening by responding to comments made by others
 - Provides feedback to classmates in a constructive manner
- **Professional conduct in class**
 - Non-verbal behavior indicates alert and engaged (e.g., eye contact with professor, no texting or non-class related laptop use)
 - Never misses class. Alerts faculty in advance if a class is missed and prepares any missed work in a timely fashion.

Good Participation (3)

Your contributions in class reflect your solid preparation. The ideas you present and questions you ask are relevant to the discussion though sometimes your comments are more descriptive and less reflective of your analysis and critical thinking about the material.

- **Preparation**
 - Discusses assigned readings with little to no reference to materials in class
- **Participation**
 - Tries to expand class discussion by bringing in new ideas
 - Frequently analyzes and applies course material
 - Draws on personal experience and opinion that is relevant to discussion
 - Prepares and participates in class/group exercises
 - Participates in many class discussions (i.e. once every 2-3 classes)
- **Interaction with colleagues**
 - Demonstrates listening skills by allowing others a chance to participate
- **Professional conduct**
 - Non-verbal behavior suggests always alert
 - Rarely misses class. Alerts faculty in advance if a class is missed and prepares any missed work in a timely fashion.

Average/Fair Participation (2)

Your contribution in class indicates average preparation. The ideas you offer are not always relevant to the current discussion and indicate you have not fully reflected on the course reading or your classmates' contributions.

- **Preparation**
 - Does some but not all of the assigned readings
 - Frequently needs to reference materials in class
- **Participation**
 - Listens actively but only participates in class discussion when solicited
 - Primarily restates reading content rather than providing analysis of material
 - Some engagement in class exercises when solicited by others
- **Interaction with colleagues**
 - Sometimes repeats comments made previously
- **Professional conduct in class**
 - Sometimes not alert or paying attention (e.g., texting in class, using laptop at inappropriate times, unable to respond in appropriate fashion when called upon)
 - Occasionally misses class. Alerts faculty after the class is missed and may not have prepared missed work.

Poor Participation (1)

You do not contribute to class either because you are silent or have not prepared.

- **Preparation**
 - Often not prepared for class
- **Participation**
 - Only participates in discussion when solicited and often can't respond
 - When participates in discussion, comments are not related to the topic
 - Does not engage in class/group activities
- **Interaction with colleagues**
 - Provides feedback to colleagues in an unconstructive manner
 - Repeats comments made earlier in the discussion
- **Professional conduct in class**
 - Body language suggests not paying attention or engaging in non-class work
 - Often late for class

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