GENDER AND CONVERSATIONAL INTERRUPTIONS IN CLINICAL SCENARIO-BASED SIMULATION TRAINING FOR MEDICAL STUDENTS

By

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ABSTRACT

Gender differences in conversational interruptions have been examined in a number of different professional areas, such as corporate and judicial settings. Previous studies on conversational interruptions show that a majority involve men interrupting women, and that these interruptions amplify the gender bias and discrimination faced by those in the workplace on a daily basis. However, there is a paucity of information reported on this subject within the field of medicine and, specifically, within undergraduate medical education. Hardly any research has explored gender and conversational interruptions amongst medical students, and between medical students and their instructors.

To address this gap, University of Arizona medical students were recorded during their Advanced Cardiovascular Life Support (ACLS) trainings in the College of Medicine Arizona Simulation Technology and Education Center (ASTEC) for analysis of interruptions. Multiple raters watched and scored the video recordings of high-fidelity, mannequin-based simulation scenarios. A coding system for interruptions was developed to evaluate the impact of not only gender, but other potentially influential factors such as the type of interruption and status of the interrupter and interruptee. After analysis of the data collected, it was found that men interrupted women more often than women interrupted men ($p<0.05$), and more specifically, male students interrupted female students twice as often as the reverse ($p<0.02$). In regard to interruption type, there were twice as many male-student-on-female-student power interruptions than there were female-student-on-male-student power interruptions ($p<0.05$). These findings have interesting implications for ways to minimize conversational interruptions in medical simulation training.

Keywords: Interruption, Conversational Interruption, Undergraduate Medical Education, Gender Differences, Gender Bias, Gender Discrimination, Simulation-Based Medical Education (SBME)

1 INTRODUCTION

Conversational interruptions provide key insight into gender bias and discrimination in a variety of professional fields. From the Supreme Court (Jacobi & Schweers, 2017) to Amazon business meetings (Newman, 2014), men have been shown to interrupt significantly more than women. One study found that 46 out of 48 interruptions identified during two-part conversations between men and women were instigated by the man (Zimmerman & West, 1975). Using a coding system, Smith-Lovin and Brody (1989) analyzed recordings of group discussions and found that men discriminated in who they chose to interrupt, interrupting women twice (2.08 times) as often as other men, whereas the women interrupted both sexes almost equally. Furthermore, Hancock and Rubin (2014) found that men interrupted women 33% more often than they interrupted other men during three-minute-long conversations.

It has also been found that men and women differ in the types of interruptions they use, and three main types have been identified: power, rapport, and relationally neutral interruptions (Julia A. Goldberg, 1990). A power interruption is an act of conflict and competition in which the interrupter cuts off the speaker in order to display social power or dominance. In contrast, rapport interruptions are acts of cooperation and collaboration in which the interrupter attempts to display empathy, mutuality, and understanding with the speaker. A relationally neutral interruption occurs when the interrupter attempts to repair, repeat, or clarify something the speaker said. Other literature has corroborated the ideas behind these types, suggesting that men are more likely than women to use interruptions as a way to assert social dominance and that male interruptions are linked with power and status (Octigan & Niederman, 1979). Women, on the other hand, are more likely to establish rapport through interruptions (Tannen, 1999; Zimmerman & West, 1975). The gender-linked language effect (GLLE) theory supports this as well, suggesting that feminine language tends to be more affirming and engaging, whereas masculine language tends to be more assertive and dynamic (Mulac, 2006). The frequency and nature of these interruptions have been shown to be influenced by gender bias and discrimination.

In the medical profession, gender bias and discrimination have been heavily researched. Studies described unequal pay, sexual harassment, and unfair opportunities for promotion and recognition awards between males and females (Carr et al., 2000; Kavilanz, 2018; Pennsylvania State University, 2017; Silver et al., 2017). The relationship between gender bias and conversational interruptions in the medical field is less characterized. One study found that gender in conversation and speech may determine performance and promotion in medicine (Smith-Lovin & Brody, 1989). Additional research is needed to support these findings.

Simulation-based medical education (SBME) provides a safe and controlled method to identify and analyze conversational interruptions in the medical field. SBME allows for acquisition of clinical skills through hands-on practice, with simulation tools that act as real patients (Al-Elq, 2010). This training method enhances clinical competence and improves patient outcomes, as well as helps cultivate the communication skills of medical students (Bagnasco et al, 2014). It has also been found that the behavior of an individual in a simulation environment directly translates to how the individual behaves in a clinical environment (Konia & Yao, 2013).

This study sought to further characterize the relationship between conversational interruptions and gender in the medical field by identifying and analyzing interruptions amongst medical students, and between medical students and their instructors during SBME. The methods, results, and limitations of this study as well as future directions to directly address gender bias and discrimination in medical education will be discussed.

2 METHODS

2.1 Coding System for Conversational Interruptions

A coding system was developed using Excel to analyze conversational interruptions during SBME. It coded for the gender and status of both the interrupter and interuptee as well as categorized the type of interruption occurring. For this study, gender was conceptually defined as whether the participant was outwardly identified as male (M) or female (F). The status of the participants signified their professional standing, based on whether they were outwardly identified as a medical student or a facilitator/instructor. In the coding system, this was presented as facilitator (F) or student (S). The three types of interruptions were power (POW), relationally neutral (NEU), and rapport (RAP). The coding system allowed for the total number of interruptions to be tallied and time-stamped.

2.2 Rater Training

Four undergraduate students from the University of Arizona were recruited and trained as raters to use the coding system in order to analyze interruptions in SBME. The raters included one male and three female students. Rater training began with an orientation to conversational interruptions and the types of interruptions. An interruption, for this study's sake, was defined as any time a person initiated talk while another person was still speaking. Multiple examples of each type of interruption were also provided via an interruption code key.

After orientation, the raters had five weeks of video analysis practice. Each week, the raters were assigned one scenario-based simulation training video to analyze independently, for a total of five videos analyzed for practice. At the end of the week, all raters met to review their coding results as a group and address any discrepancies in the video coding. The raters

were also tested each week for interrater reliability (IRR), with the last IRR prior to the start of the study being a value of 0.915, indicating high agreement among the raters.

Shortly after the study commenced, the male rater dropped out. The video analysis was fully completed by all three of the female raters.

2.3 Study Design

The study took place at the Arizona Simulation Technology and Education Center (ASTEC). Third-year students (n=40) from the University of Arizona College of Medicine-Tucson and their instructors (n=7) were recruited to participate. Participants included both male (n=13) and female (n=27) students, as well as both male (n=4) and female (n=3) instructors.

Students were divided into teams of 4-6 to undergo an ACLS training. It was decided that ACLS trainings would be used for the study, due to their optimal balance of male to female instructors and lack of script use. Each team was assigned an instructor and a simulation training room that included a CodeBlue mannequin (Gaumard), an R Series Defibrillator (Zoll), a headwall, airway supplies, a code cart, and a stool. Teams completed multiple ACLS scenarios to allow each student the opportunity to play the role of team lead. These trainings were recorded using a built-in camera system, and the audiovisual (AV) recordings were stored in LearningSpace (CAE).

Seven ACLS trainings were recorded, with a total of 41 scenarios to obtain data from. Data was collected from any part of the simulation scenario that took place in the room, including the pre-briefing, the simulation scenario, and the debriefing. All raters had access to the video recordings via the LearningSpace AV system. The raters were then tasked with analyzing each recording individually using the developed coding system.

2.4 Statistical Analysis

Data from all 41 scenarios was analyzed and compared using multiple two-tailed independent samples t-tests on Excel. The total number of interruptions was scaled to the individual level to account for the greater number of female students in the study. IRR and intraclass correlation coefficient (ICC) tests were performed to analyze interrater reliability.

3 RESULTS

After performing two-tailed independent sample t-tests on the data in Excel, three key findings were discovered (Graph 1). A t-test performed on all groups (male students (n=13), female students (n=27), male instructors (n=4), and female instructors (n=3)) revealed that males interrupted females significantly more often than females interrupted males ($p<0.05$). It was also found that male students interrupted female students more often than female students interrupted male students at a ratio of 2:2:1 ($p<0.02$). Lastly, there were more male-

student-on-female-student power interruptions than there were female-student-on-male-student power interruptions at a ratio of 2:6:1 ($p<0.05$). There was a trend toward higher numbers of interruptions and number of power interruptions among the males. There were no significant findings amongst the number of interruptions between students and instructors or between male and female instructors.

ICC and IRR tests were also performed using Excel in order to assess interrater reliability amongst the raters (n=2). Only data from two out of the four raters was used. One rater dropped out of the study, so there was no data to use. The other rater consistently rated significantly fewer interruptions than the other two remaining raters across all categories, which lowered the ICC and IRR values, so their data was ultimately not used. Data for the ICC was obtained by comparing the total number of both male and female interruptions from each video for each rater. An IRR was also calculated for the type of interruptions recorded by the raters. The ICC value was 0.819 and the IRR value was 0.815, both indicating moderately high interrater reliability among the two raters.

4 DISCUSSION

4.1 Implications of the Data

It was predicted that males would interrupt more than females since previous studies have shown that men account for more than half, if not the vast majority of conversational interruptions in any given context or field (McMillan et al., 1977; Willis & Williams, 1976; Zimmerman & West, 1975). This was true within the context of this study, as males interrupted females significantly more often than females interrupted males. This was also true when examining total male-student-on-female-student vs. female-student-on-male-student interruptions, and it was found that male students interrupted female students more than twice as often as the reverse. It was also expected that the male participants would be more likely to use power interruptions than the female participants based on previous research (Mulac, 2006; Zimmerman & West, 1975). This was also found to be true in the context of this study, as there were twice as many male-student-on-female-student power interruptions than the reverse. These findings further support that men interrupt women more often than women interrupt men, and that men tend to use power interruptions more than women do.

These findings support that there is gender bias present within undergraduate medical education, and more specifically within SBME, whose main purpose is to engender better teamwork and improve the interprofessional skills of medical students. This suggests that better safeguards against gender bias, not only in SBME, but perhaps in medical education altogether, are necessary. As the majority of medical students become practicing physicians after their four years of medical school, it is crucial that they are properly trained on how to combat various forms of bias and discrimination that are present within the medical field.

This is essential in order for future physicians to learn how to treat diverse patients, as well as how to interact with their colleagues. Many medical schools already have implicit bias curricula in place to decrease disparities in health care (Haelle, 2019). However, it is also important to expose students to how doctors properly interact with one another in the workplace. Previous studies indicate that gender bias and discrimination contribute to physician burnout, lower career satisfaction, and diminished overall well-being (Templeton et al., 2019), which are compelling reasons these issues are so important to address. The results from this study reveal that undergraduate medical education would benefit from implementing safeguards such as additional training sessions, classes, workshops, or other interventions related to directly addressing gender bias and discrimination within medical education and SBME.

4.2 Limitations

There were multiple limitations found within this study, including: small sample sizes, variation in scenario video capture, lack of diversity among raters, and rater inconsistency.

The small sample sizes among students (n=40) and instructors (n=7) may have limited the statistical significance of this study. No significant findings were made amongst instructor data. While ACLS trainings were chosen because they had a balanced number of male (n=4) to female (n=3) instructors, the ratio of male (n=13) to female students (n=27) in each training could not be controlled. Having a larger number of female students compared to male students could have greatly impacted conversational team dynamics. This gender discrepancy also led to the initial findings that there were a greater number of total female-initiated interruptions. However, this issue was dealt with by scaling the data to the average number of interruptions per individual in each subset.

The video recordings of the simulation scenarios included any and all aspects of the scenario that took place in the training room. In three of the videos, the entire scenario was captured, but in the other four video recordings, part of the debriefing occurred in another room that was not recorded for analysis. Many of the interruptions documented came from the debriefings onscreen, so it is possible that many interruptions were missed in the recordings that debriefed offscreen. In future studies, it would be important to ensure that all debriefings occurred onscreen.

Lastly, this study had limitations amongst rater diversity and consistency. The only male rater dropped out halfway through the study. With three female raters collecting all of the data, the study could be implicitly biased since a major goal of the study was identifying gender differences in interruptions. For future research, it would be ideal to recruit at least two female raters and two male raters and consider incentivizing rater participation. This study also had inconsistencies among raters throughout the study. Although IRR showed

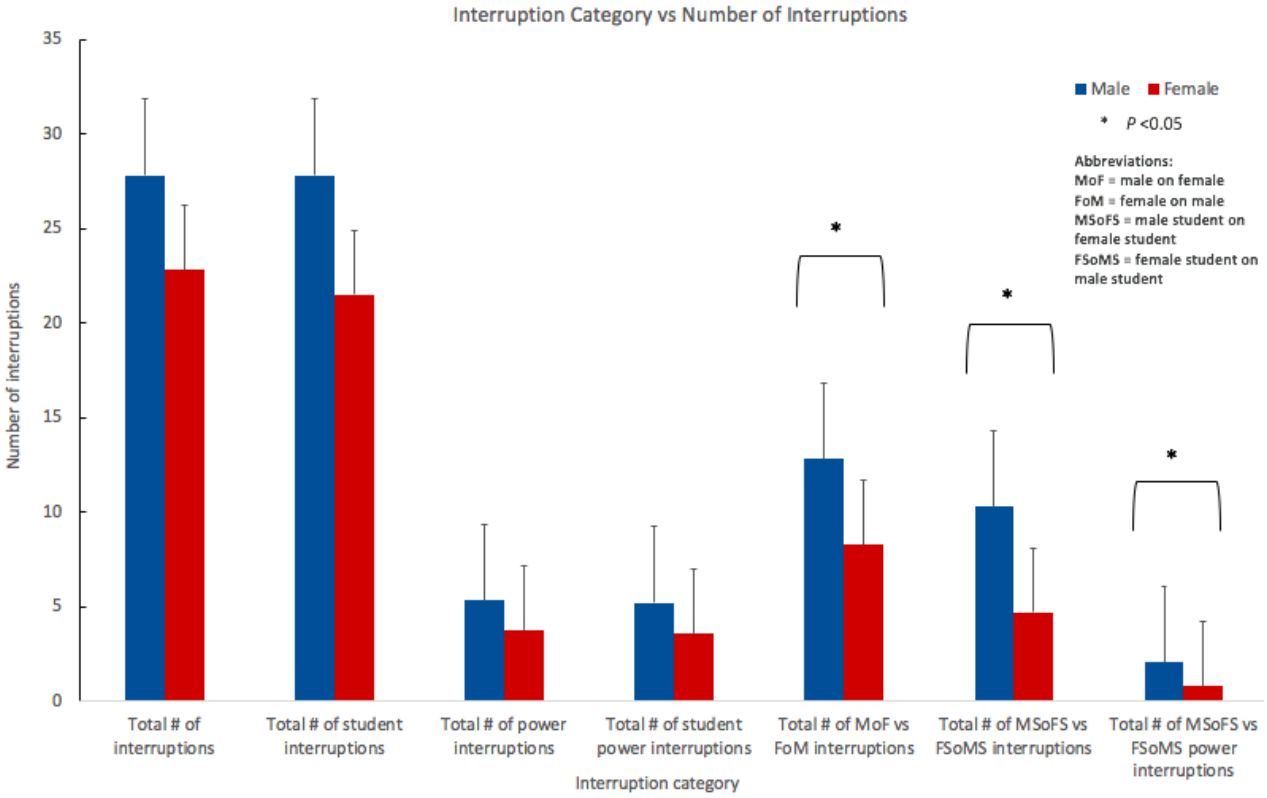
strong interrater reliability after rater training, one rater consistently rated fewer interruptions throughout the study. It was ultimately decided that the data of the third rater could not be used, since it varied significantly from the data of the other two raters. The IRR for all three raters was 0.697, whereas taking out the third rater improved the IRR and increased the value to 0.817. Improving upon the rater training protocol could lead to higher interrater reliability and less potential bias in future studies.

4.3 Future Directions

This study, the first to examine gender differences in conversational interruptions amongst medical students and between medical students and their instructors, has revealed that gender plays a substantial role in interruptions within SBME. This is a supplementary addition to the literature on gender and conversational interruptions in the fields of medicine and education, as well as a novel addition to the literature on gender bias in undergraduate medical education and SBME. Future research in this area could examine different undergraduate students in healthcare, such as nursing and pharmacy students, to see if these gender differences are also observed in different but similar SBME activities. Since this study was not able to identify any significant differences among instructors, future research could also focus specifically on instructor interactions with students and other instructors, using a slightly modified coding system to look for gender differences in conversational interruptions. Future studies could also focus more closely on the three types of interruptions (power, rapport, and relationally neutral) to see if the trend that males are more likely to use power interruptions than females holds. It may also be favorable to repeat this study, or a similar version, using new video recordings and a larger sample size in order to increase statistical power of the data. Selecting a different type of simulation training video other than ACLS trainings may also be beneficial for future studies.

Recent research has also suggested that microaggressions are a growing source of gender bias and discrimination, particularly in academic medicine. In one study, microaggressions, which are subtle verbal or nonverbal behaviors that arise from bias, prejudice, or hostility, were reported at much higher frequencies by female faculty than were reported by male faculty (Periyakoil et al., 2016). Microaggressions in the workplace can lead to decreased performance, heightened stress, and poor mental health, according to another study (Pascoe & Smart, 2009). While one study examining microaggressions in medical schools found that 68% of female minority students and 76% of white female students reported experiencing microaggressions (Espaillat et al., 2019), more research is needed in this area focusing on how medical students perceive microaggressions. If similar gender differences were found with microaggressions as found with conversational interruptions, future studies could focus on developing tools or training for gender bias and discrimination that address both interruptions and microaggressions in undergraduate medical education and SBME.

Graph 1


Interruption Category vs Number of Interruptions
Number of interruptions
35
30
25
20
15
10
5
0
Male
Female
* P <0.05
Abbreviations:
MoF = male on female
FoM = female on male
MSoFS = male student on female student
FSoMS = female student on male student
*
*
*
Total # of interruptions
Total # of student interruptions
Total # of power interruptions
Total # of student power interruptions
Total # of MoF vs FoM interruptions
Total # of MSoFS vs FSoMS interruptions
Total # of MSoFS vs FSoMS power interruptions
Interruption category

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