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Speaking up on attending ward rounds: a qualitative study of internal medicine residents

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Attending rounds are a core educational component of learning in teaching hospitals. Speaking up in this context has not been explored among medical residents. We aimed to understand residents' perspectives on speaking up about their own clinical reasoning during attending rounds. This was a qualitative study performed at a single teaching hospital. We selected a random sample of 45 internal medicine residents among 141 in the training program, among whom 21 accepted the invitation to participate. Semi-structured interviews were conducted over Zoom. We performed thematic analysis within a social constructionist epistemology to develop codes, categories, and themes. Analysis continued until thematic saturation was achieved. We interviewed 21 residents, including 9 interns, 7 junior residents, and 5 senior residents. Residents described factors related to team culture, team dynamics, knowledge and experience, domain of patient care, and structure of rounds that influence speaking up during rounds. We identified four themes that were critical for speaking up: (1) promoting a culture of learning; (2) creating psychological safety; (3) developing self-efficacy; and (4) fostering resident autonomy. Feedback from the attending, particularly nonverbal cues perceived as negative, played a prominent role in preventing residents from speaking up. We identified factors for speaking up among residents during attending rounds. Feedback conveyed during attending rounds influenced the culture of learning, psychological safety, and residents' self-efficacy, which impacted residents' motivation to speak up. Ward attendings should be mindful of verbal and nonverbal forms of feedback on rounds.

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Introduction

Attending rounds involving residents, students, and the attending physician have been a core component of clinical learning in internal medicine training programs since the time of William Osler (Osler, 1903). Their purpose is to make clinical decisions, educate and evaluate trainees, and communicate with patients (Hulland et al. 2017; Rabinowitz et al. 2016). Full, free, and open exchange between attending physicians and trainees about clinical reasoning and decision making can improve both learning and patient care (Armendariz et al. 2021; Stickrath et al. 2013). However, open discussion on attending rounds is not always achieved.

Speaking up can be defined as the voicing of ideas, information, or concerns whenever unprompted (Morrison, 2011). We adopt this general definition in order to apply it in a new context (team discussions during attending rounds), whereas previous research on trainees' speaking up has focused on quality and patient safety or unprofessional behavior (Belyansky et al. 2011; Bould et al. 2015; Kobayashi et al. 2006; Landgren et al. 2016; Martinez et al. 2015; Okuyama et al. 2014; Sydor et al. 2013; Voogt et al. 2020). These studies have shown that the medical hierarchy is a critical barrier to speaking up. Research also suggests that psychological safety (when team members feel able to speak up without fear of negative consequences) is critical in medical education to facilitate communication and learning (Tsuei et al. 2019).

A theoretical framework of human motivation to perform in the workplace is self-determination theory (SDT), which posits that work performance and personal well-being are affected by the type of motivation to perform the job activity (Deci et al. 2017). Given that clinical reasoning performance and learning are essential activities of attending rounds, it is important to understand residents' motivations to speak up in this context.

The purpose of this study was to explore the perspectives and experiences of internal medicine residents on speaking up about their clinical reasoning and decision making during attending rounds, and to identify motivating and inhibiting factors that influence their speaking up behaviors. Such insights may direct targets for interventions to improve the quality of attending rounds, medical education, and patient care.

Methods

Study design. We conducted a qualitative semi-structured interview study with internal medicine residents at an academic medical center in New York City between June 2021 and March 2022. We used thematic analysis within a social constructionist epistemology, which views knowledge (what we understand and know about the world) as co-created through social processes and focuses on how social interactions shape our understanding of the world (Braun and Clarke, 2006; Kvale, 1995). We chose one-on-one interviews, rather than focus groups, to enable the gathering of perspectives and experiences without influence from other group members.

We considered the relationship of the investigators with medical residents in the conduct of our study to mitigate potential bias and undue influence on study participants. The principal investigator (JJC), who primarily performed data collection and analysis, is a hospitalist who occasionally attends on the general medicine service and does not have an administrative role within the residency training program. PL, JHC, AM, and KG are directly involved with residents as program directors and/or attending physicians; their roles were in study design, interpretation of de-identified findings, and manuscript writing. They were not involved in study recruitment, enrollment, or data collection, and had no knowledge of which residents participated in this study. The remaining investigators (NM, WM, LR, MFS) had no direct involvement with residents. This study was approved by the Weill Cornell Medicine Institutional Review Board (#20-10022832).

Participants. We used random sampling to recruit residents from a single internal medicine residency program in New York City. There were 141 residents in the program. Program directors were aware of the study, but not of the identities of residents who were contacted for potential participation. Residents who had ever been under the direct supervision of the principal investigator were excluded. We recruited residents by e-mail at the end of June 2021 based on a sequence determined by use of a random number generator. Participants were enrolled upon responding positively to the e-mail and providing their informed consent. Interviews were conducted between September 2021 and March 2022 depending on the residents' and principal investigator's availability outside of patient care duties.

Data collection. The principal investigator (JJC) conducted interviews through Zoom video conferencing. The interview guide (Supplemental Appendix) was developed by the research team (JJC, JHC, PL, WM, MFS) and guided by a qualitative research expert (LR). The interview began with our aforementioned definition of speaking up, followed by an open-ended question eliciting perspectives on speaking speaking up during rounds. The interview then transitioned to more specific questions, including describing the kinds of issues they have or have not felt comfortable speaking up about, the likelihood of speaking up to other team members, factors that encourage or discourage speaking up, and in-depth descriptions of past experiences in which participants did or did not speak up during rounds.

Data analysis. We transcribed interviews verbatim and anonymized the data. We analyzed data without a priori hypotheses using thematic analysis in three stages (Corbin and Strauss, 1990; Strauss and Corbin, 1997). In the first stage, two researchers (JJC, NM) independently reviewed 10 transcripts, first familiarizing themselves with the data, then assigning codes to relevant data segments (words, phrases, sentences). The researchers met on several occasions to iteratively discuss codes and resolve discrepancies through deliberation and consensus. The researchers coded additional interviews and organized codes into categories and subcategories. In the second stage, codes and categories were presented and discussed with two other researchers (LR, MFS) in order to further refine categories and build themes that included multiple codes. The initial pair of researchers (JJC, NM) then deductively looked back at the data from the themes to ensure their accuracy. This process continued until thematic saturation was reached and no additional themes emerged. In the third stage, codes, categories, and themes were shared and discussed with all co-authors to prepare a report of the study findings. All data analysis was conducted using Microsoft Office software.

Results

We invited 45 internal medicine residents; 21 accepted and were interviewed (9 interns, 7 junior residents, and 5 senior residents; 11 were female). The duration of interviews ranged from 28 min to 41 min. Residents described a range of factors that positively and/or negatively influenced speaking up during rounds. These were organized in five main categories (Table 1): *team culture* (the people on the team, their roles, behaviors, beliefs, attitudes, and social identities); *team dynamics* (processes and interactions between or among team members); *knowledge and experience* (medical knowledge, knowledge about the patient, or clinical

Table 1 Categories and topics in responses to "What factors influence speaking up during attending rounds?".

Categories	Topics	Representative Quotes
Team culture	Hierarchy	"I think with a hierarchical structure, speaking up can happen, but sometimes everyone sort of waits their turn. On the other hand, there are definitely team structures where it doesn't feel like a hierarchy is in place. Then it doesn't matter if it's an intern, medical student, or whomever is speaking because we're all on equal ground." (SR5)
	Roles and responsibilities	"On attending rounds the culture is already established that as a 2nd year or 3rd year, you are stepping into a leadership role. In those situations I do feel more comfortable speaking up." (JR14)
	Teaching focus, Efficiency focus	"What prompts me to want to speak up on rounds is the culture that the attending sets. If the attending is someone who clearly doesn't want to listen, wants to get through it as fast as possible, and doesn't do much teaching, then it's hard to want to bring anything up. But if you have an attending who encourages teaching and discussion, I'm going to be more likely to speak." (SR2)
	Leadership style and expectations	"Some attendings are very good at asking questions and being open-ended and letting the residents drive things, and that certainly invites us to speak up a bit more, which I find very comforting and helpful." (I19) "I think I would be more likely to speak up if the attending explicitly encourages [speaking up] to the whole team on day one when setting expectations." (I21)
	Safe environment	"I do watch attendings and other residents, and whether or not they are creating a culture of safety. A safer environment allows me to feel like I am allowed to explain my thought process. If other people are doing it, I model that behavior back at them." (I16)
	Imposter syndrome	"We are still residents in training so I feel like I have a huge knowledge deficit. Sometimes I [feel] like by speaking up I am going to expose myself, especially at the beginning [of residency]." (SR3)
	Burnout and stress	"There was a time when I was presenting an overnight admission, and the patient was really, really sick, and I had three admissions to present that morning, but I was tired. I was just burned out. I wanted to go home." (JR14)
	Humility	"I think if attendings show humility, then you feel like you can be vulnerable and it is okay to state your opinion." (JR12)
	Program culture	"In terms of what creates an environment that allows me to speak up, I think it goes broader. I think the culture of the program itself is such that people feel very open and comfortable with each other. I think the fact that we all went into internal medicine is something to bond over." (JR8)
	Social identities (gender, race and ethnicity)	"[Being] Asian, I definitely felt the pressure that everybody assumes that you are [the] quiet one on rounds." (I17) "And I noticed at that time [during rounds], I was the only woman in the room, and everybody else around me was male. I think with psychiatric issues in particular... I've noticed a lot of bias against these patients. And so, I didn't say anything about [my concern in how we were stereotyping this female patient]. I felt pretty uncomfortable." (I16)
Team dynamic	Rapport with the attending	"Probably the biggest factor is the rapport and relationship with the attending. I think in general, there are definitely attendings with whom I can say pretty much anything, anytime." (SR5)
	Resident dynamic	"I have some really good senior residents who are pushing the more junior residents to speak up. The really good residents never make you feel like you're being put on the spot, because after I present I know that they will always chime in at the end. So in that way, it's almost like you're speaking up together." (I17)
	Feedback	"There's a feedback loop [with the attending]. When you know what the attending is looking for, and the attending is giving you good feedback, it reinforces the ability to speak up." (JR8) "I think if you bring a comment up and it builds a positive discussion, then you're kind of subconsciously reinforced." (SR5)
	Fear of judgment or evaluation	"I've never had anyone say you can't speak up or ask questions. I think it's just a perceived fear that you'll be judged." (I18) "Maybe part of me is stuck in the medical student's perspective where you feel like you're constantly being evaluated, so you can't ask the questions you really need to ask." (JR7)
	Team cohesion	"There were times when I didn't quite understand why we were doing something or I didn't necessarily agree with what we were doing, but because I think we were close and they had that experience, I just deferred to them." (I20)
	Observing team interactions	"A lot of [speaking up] is by observing interactions. I think observing the interactions of others and seeing whether or not they go into depth [on a topic] is a good way to gauge whether they are open to discussion." (I1)

Table 1 (continued)

Categories	Topics	Representative Quotes
Knowledge and experience	Knowledge	"I think that speaking up gets easier as you become more comfortable with your knowledge base." (SR9) "I do feel like if I know the patient, I do feel more comfortable speaking up because we are on the frontline with the patient. We know them better than the attending." (JR14)
	Experience	"I have a lot more experience in oncology, because that's what I'm interested in doing, and I spent more time as a medical student rotating in those services. So I just feel more comfortable on those rotations." (I15)
	Uncertainty	"I feel like I've not been speaking up on attending rounds because I don't know how it will be received." (I21) "I personally don't like to interrupt and voice my opinions without knowing what I'm getting into." (I11)
	Confidence	"I feel pretty confident in my clinical judgment where if something is going on and I want to voice it, then I will." (SR6)
	Specialty	"I think in settings like the ICU and CCU, it is more specialized so it tends to not be my area of expertize. I think people have that feeling that you shouldn't speak up as much." (JR13)
Patient care domain	Patient safety	"The times in which I would feel that I really needed to speak up are cases in which it is a matter of patient safety." (SR6)
	Management decisions	"If it's anything related to making decisions about patients, about their plans, I'm likely going to speak up in those situations." (JR10)
	Social or ethical issues	"When it comes to the social determinants of health, because we are residents and we spend more time with the patient, we might know them better on the personal level, and I feel more comfortable to talk about those kinds of things." (I17)
	Consultants	"It's harder as the intern, and even as the resident, to really voice your opinion against a consultant." (I20)
Structure of rounds	Rounding style (e.g., table rounds, bedside rounds)	"I think with table rounds, I may feel more comfortable speaking up because you're not necessarily in front of the patient, and you don't want to disagree with your attending in front of the patient, or voice a concern in front of the patient [during bedside rounds]." (JR14)
	Presentation and discussion format	"Some attendings want very structured presentations and discussions, which can be off-putting for speaking up." (SR5) "The unstructured conversation lets us dive deeper into more speaking up on the nuances of decision making." (SR6)
	Performance of rounds	"There feels like this overwhelming pressure to have something to add to the presentation. And I feel like if you don't, then it's like, 'Were you listening? Do you not know anything?'" (JR7)

experience); *the domain of patient care* (the clinical topic or decision being discussed); and *the structure of rounds* (how and where rounds are conducted; the format of case presentations and discussions). In our interviews, residents discussed multiple topics (i.e. codes) related to each category (ranging from 2 to 14 per category; see Supplemental Appendix). We identified four major themes across these categories and topics. Many categories and topics embodied multiple themes. Quotes are attributed to the participant identification codes: intern (I), junior resident (JR), or senior resident (SR) and their subject number (1–21).

Theme 1: Promoting a culture of learning. Many residents felt more comfortable speaking up when the attending physician or others leading rounds established a culture of learning. As one resident stated, "I feel like most of my hesitation towards asking questions is focused on [the] particular attending, senior resident, or fellow leading rounds, and their perceived attitude towards teaching." (I1)

A motivation for speaking up among residents was to bolster learning for all team members. Residents believed that role modeling how to acknowledge uncertainty around clinical decision making was important to promote speaking up among all team members. One resident believed that if they had a question about clinical decision making, it was likely that others, like medical students, would have it too. One resident reported that the mere presence of medical students "actually encourages asking questions so everyone can learn." (SR3)

A significant tension with promoting a culture of learning was the focus on rounding efficiency. Residents believed that the trade-off between focusing rounds on teaching versus efficiency in patient care strongly influences the culture of learning given time constraints on rounds. Attending physicians who focused on teaching were perceived as being open to questions. A focus on rounding efficiency limited opportunities for speaking up. A common example provided by residents is when attending physicians instruct learners to shorten their presentations. Another example was when attending physicians give implicit feedback through nonverbal cues: "When I see [attendings] looking away, jittering, moving their legs, looking at their phone, then I feel like maybe I should shorten my presentation." (I11)

The location of rounds also influenced the culture of learning. Residents invariably reported reluctance to speak up or ask questions in front of patients and more willingness to do so in the workroom, where they felt better prepared for discussions with easy access to computers. The workroom was perceived as a safer environment for speaking up. In addition, the format of case discussions influenced whether team members were given opportunities to speak up and give feedback.

> "I think that you can be very thoughtful about the way that you set up learning opportunities on the team by creating a [structure for discussions]. For example, if you start with

> the medical students,[…] the intern can give feedback if they wanted to, and then the senior resident, and so on." (I16)

Theme 2: Creating psychological safety. Residents reported speaking up most when team members, particularly the attending physician, created psychological safety that allowed for asking questions and sharing opinions without negative judgment or repercussions. Several residents identified humility as an important characteristic of attending physicians for creating psychological safety: "If you have an attending on the team demonstrating that they're humble about what they don't know, that they're not responding to learners with a sense of judgment, all of that goes into creating a safe culture to speak up." (I16)

Residents believed that it was the responsibility of the attending physician to be proactive in assuring a safe environment. One resident said, "I think the attending needs to set the tone that this is a safe environment," (JR4) while another resident suggested that all attending physicians "should verbalize the expectation that rounds is a safe environment." (I11) A resident believed that attending physicians who "set those expectations in the beginning make it more comfortable for [residents] to speak up." (JR14)

Residents also identified senior residents as having a role in creating psychological safety. Interns felt comfortable speaking up during rounds when they "trusted their senior residents to have their back." (I19) In contrast, some residents recalled working with senior residents who were not particularly supportive and were harsh in their feedback, which caused one to "not want to talk at all." (SR2)

Expectations of how to present and discuss cases during rounds also influenced residents' perception of psychological safety. Some described case presentations and team discussions as a 'performance,' referring to both their structured format and the expectations to speak that have been set as norms in internal medicine training. While the performative nature of rounds prompted some residents to speak up "regardless of the added value," (JR10) it also led to residents remaining silent if they felt "it was not their turn to speak up." (SR5)

Finally, residents viewed their social identities, in particular their gender, race, and ethnicity, as important factors in creating psychological safety during rounds: "I think implicit within everything and how comfortable any of us feel in any space is going to be related to things like race and gender and personality." (I16) However, perspectives were mixed as one resident said: "If I'm the only female on the team, I don't feel like it's much of an issue [in speaking up]." (I11)

Theme 3: Developing self-efficacy. Self-efficacy is the belief that one can successfully perform a task. Nearly all residents we interviewed correlated their likelihood of speaking up with their degree of confidence in their clinical judgment, decision making skills, knowledge base, and experience. Residents expressed more reluctance to speak up in settings where they perceived a lack of self-efficacy in clinical decision making for specific domains. They tended to defer to those with greater expertise in specialized settings such as critical care, cardiology, and oncology. In contrast, residents felt more confident in speaking up on general medicine services.

We found that self-efficacy for speaking up changed over time. Over the course of residency training, residents reported that they did little speaking up as an intern, then spoke up more as a junior and senior resident. One resident said, "I think as an intern, I was always afraid of saying the wrong thing. I think now that I'm the senior on the team, I speak up a lot more, and I think this has to do with the fact that over the years my knowledge has gotten broader." (SR9) Several residents described their own 'imposter syndrome' as being heightened at the beginning of residency and prevented them from speaking up more as interns.

During rotations, reluctance to speak up often diminished as residents grew more comfortable with their teams and got to know their patients better. One intern said that by knowing their patients better over time, they felt "more confident in advocating for what the patient wants." (I19) Another intern said that by knowing their patients "on the personal level," (I17) they felt better equipped to speak on social or ethical issues related to their patient's care.

Feedback played a prominent role for several residents in either enhancing or diminishing their self-efficacy. Residents felt more confident in their clinical reasoning and decision making when attending physicians provided positive reinforcement through verbal acknowledgment of their opinions, active listening and responding to their proposed decisions, and through nonverbal cues such as body language, tone, and eye contact. On the other hand, negative feedback lowered self-confidence and decreased motivation to speak up.

> "Positive reinforcement as opposed to negative reinforcement would be received well by residents. As a resident there are times when you never felt like the attending was listening to you. They would just let you finish talking, and then the attending would just say what they are thinking. It made me feel less confident to speak up the next time because it felt like no matter what I said, I wasn't going to be validated." (JR12)

Theme 4: Fostering resident autonomy. We found that resident autonomy, the opportunity to manage patients on their own (Hinchey et al. 2009), played an important role in speaking up on rounds. Residents were more likely to speak up when they felt that they had greater autonomy in patient care. The strongest factor in determining how residents perceived their autonomy was attending leadership style, which were categorized by residents as either "authoritative" (or micromanaging) or "hands-off."

Attending physician behaviors that reflected an authoritative leadership style included not listening to residents, frequently interrupting, and having a 'dominating' or 'strong' personality. Residents remained silent when working with micromanagers who arrived on rounds with predetermined plans of care. When residents were collaboratively involved in determining the plan of care, or were given the lead role in decision making by hands-off attending physicians, they felt more comfortable speaking up during rounds. Residents viewed the degree to which they were micromanaged as a reflection of how much the attending physician trusted them with patient care decisions.

> "Residency is very hard just because you're at the mercy of the attending. One week you have an attending that's like, "Hey, whatever you want as long as you don't do anything that's dangerous." And then [another week] you have an attending who is micromanaging everything. And micromanaging to me is interpreted as somebody who doesn't feel comfortable with your decisions." (SR9)

Discussion

This study provided insights into motivating and inhibiting factors that influence speaking up behaviors among medical residents during attending rounds. Team culture, team dynamics, residents' knowledge and experience, the domain of patient care, and the structure of rounds influenced speaking up during team

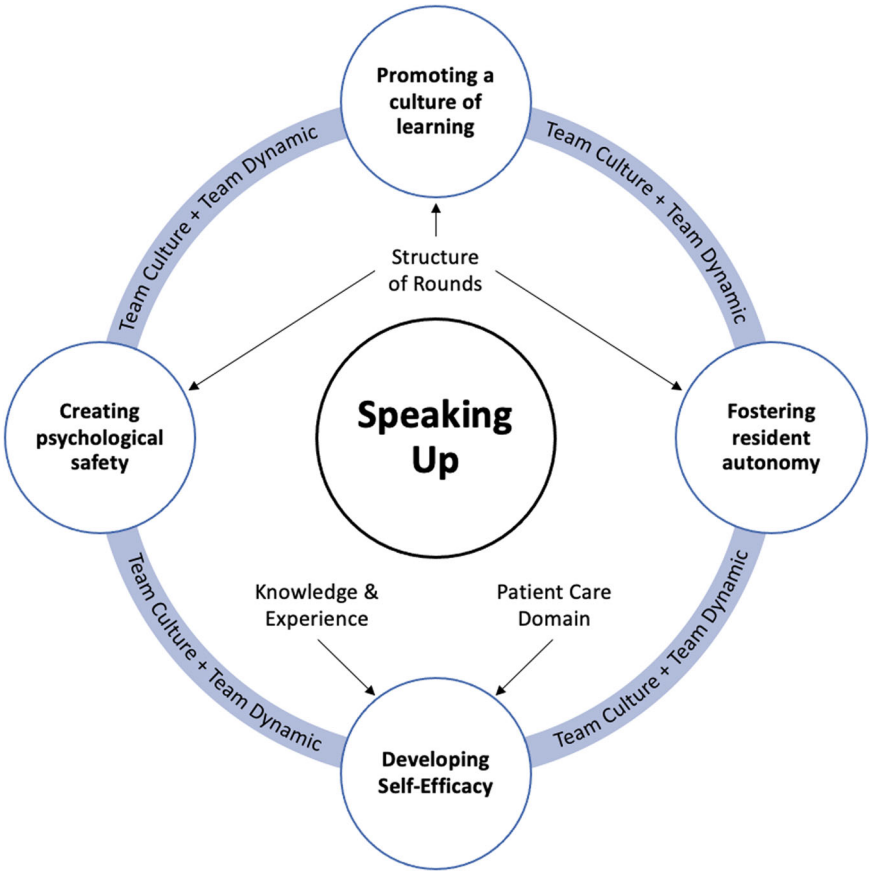

Fig. 1 This model illustrates the major themes (outer ring circles) that emerged from interviews with internal medicine residents on speaking up during attending rounds, and the categories of factors that influenced each major theme. Team culture and team dynamic factors influenced all major themes. The structure of rounds influenced psychological safety, learning culture, and resident autonomy. Factors relating to residents' knowledge, experience, and patient care domain influenced their self-efficacy.

discussions in ways that either positively or negatively influenced four major themes: promoting a culture of learning, creating psychological safety, developing self-efficacy, and fostering resident autonomy (Fig. 1).

We identified many factors that influenced residents' speaking up that are aligned with those identified in other studies of speaking up in health care teams or organizations: hierarchy, fear of repercussions, relationships with other team members, team leadership and attitudes of leaders, confidence based on experience, psychological safety, and imposter syndrome (Belyansky et al. 2011; Cosby and Croskerry, 2004; Edmondson, 2003; Greenberg et al. 2007; Kobayashi et al. 2006; Lewis and Tully, 2009; Liao et al. 2014; Lyndon et al. 2012; Martinez and Lehmann, 2013; Sutcliffe et al. 2004). Okuyama et al. previously developed a comprehensive model for health care professionals' speaking up behaviors that included these factors, and others such as motivation to help patients, hospital administrative support, job satisfaction, and professionalism (Okuyama et al. 2014). However, we also identified factors specific to the context of attending rounds: feedback loops during team discussions in the form of verbal and nonverbal communication; the focus on teaching versus rounding efficiency; depth of knowledge about a patient's circumstances; conflicts with consultants; and the performative nature of rounds.

In this study, feedback during attending rounds played a prominent role in developing a culture of learning, creating psychological safety, and promoting self-efficacy from the residents' perspective. This aligns with literature on effective clinical teaching, as providing specific and timely feedback is an important quality of attending physicians that improves learner satisfaction and performance (Merritt et al. 2017). We also found that residents perceived feedback as 'negative' if their attendings exhibited certain behaviors such as a lack of acknowledging their contributions to team discussions, avoiding eye contact, and other nonverbal cues for not listening. Residents reported these instances of negative feedback as significantly detrimental to their speaking up behaviors during attending rounds. As demonstrated in a qualitative study of exemplary inpatient teaching behaviors, attending physicians who foster positive relationships with team members through 'informal' actions such as using first names, demonstrating interest, and recognizing learners' success, are able to create psychological safety (Houchens et al. 2017).

Through the lens of SDT, feedback supports basic psychological needs for competence (i.e., enacting a skill), autonomy (i.e., freedom to choose one's actions), and relatedness (i.e., the desire to belong) (Deci et al. 2017). However, feedback conveyed in the clinical environment also has the potential to negatively affect learners' feelings of competence, autonomy, and relatedness (ten Cate, 2013). Structured methods of feedback have received substantial attention in medical education, including the adoption of models and frameworks for delivering feedback such as the older Pendleton model and the newer R2C2 (relationship, reaction, content, coaching) model, among others (Bing-You et al. 2017; Pendleton, 1984; Sargeant et al. 2015). However, none effectively integrate the nature of feedback delivered (beyond timeliness and specificity to the learner or patient), nonverbal cues, or the ideal ratio of positive to negative reinforcements for conveying feedback to residents in the clinical environment. Future studies

should refine or create feedback frameworks that consider these elements to improve residents' intrinsic motivation for speaking up.

Another consideration in speaking up behaviors is social identity, particularly one's gender, race, and ethnicity. We identified social identity as a factor in team culture that influenced teams' psychological safety and willingness of residents to speak up. Few other studies have examined the role that gender, race, or ethnicity plays in speaking up, voice behavior, or engaging in teamwork in medical education or health care (Bartels et al. 2008; Fagan et al. 2016; Martinez et al. 2014; Schwappach and Gehring, 2015). These studies, in addition to studies in fields of organizational behavior, demonstrate that there may be gender differences in speaking up; however, results are mixed (Morrison, 2011). This is likely due to complexities in considering one's social identity. Social identity is a multifaceted construct that interacts with other personal and situational factors that can lead to varied outcomes in different contexts (Charness and Chen, 2020; Hogg et al. 1995). While we did not design this study for analysis of gender or race and ethnicity differences, future research in medical education and other disciplines should aim to identify mechanisms in the relationship between social identity and outcomes in speaking up behaviors.

Our study has several limitations. First, our sample was restricted to internal medicine residents at a single academic medical center and may not reflect the experiences of residents in other specialties or teaching hospitals. Second, there may be selection bias given 24 residents did not respond to our study recruitment e-mail. We do not know how non-participants differed from participants, but participation may reflect a willingness to speak up. Third, despite our best efforts to ensure the interviewer was an individual who was not part of residency leadership, the fact that they were an attending faculty member could have affected responses, perhaps by diminishing willingness to criticize the environment in the program. Lastly, de-identification of participants in coding interview transcripts limited any comparisons based on gender, race, or ethnicity of participants, and also limited a more detailed description of study participants. We felt it was necessary to de-identify participants given the relatively small population of residents and to preserve anonymity and confidentiality.

In conclusion, we identified a range of important factors that influence residents' speaking up behaviors during attending rounds. Researchers and educators should seek to develop educational interventions that promote a culture of learning, develop residents' self-efficacy over time, create psychological safety within clinical teams, and foster resident autonomy in patient care in order to enhance speaking up among residents to improve learning and performance.

Data availability

The datasets generated during and/or analyzed are available from the corresponding author on reasonable request.

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Author contributions

JJC contributed to the conceptual and design, acquisition of data, analysis and interpretation of data. NM, LR, WM, and MFS made substantial contributions to the analysis and/or interpretation of data. PL, JHC, AM, and KG made substantial contributions to the conception, design, and interpretation of data. All authors revised drafts of the manuscript for important intellectual content and provided their final approval of the version to be published.

Competing interests

The authors declare no competing interests.

Ethical approval

This study was approved by the Weill Cornell Medicine Institutional Review Board (#20-10022832) and the authors certify that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all study participants.

Additional information

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