

Equity and off-task discussion in a collaborative small group

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Participation in sensemaking discourse is widely seen as important to students' learning in physics classes. Many physics curricula and pedagogical strategies use collaborative small group activities to create opportunities for students to engage in authentic collaborative sensemaking discourse, but we also know collaborative small groups sometimes function inequitably. Access to discourse in them is co-constructed by group members and impacted by both the histories of individual members and the cultural attitudes and expectations they bring. As a result, some students can be marginalized and excluded from fair access to valuable participation in discourse. This study focuses on one student in a previously studied small group known to frequently function inequitably. The focus student, "Jessica", was an infrequent participant and arguably a low-influence member of the group. Because she was usually denied fair access to participation in the on-task sensemaking discourse, Jessica is a type of student our research community needs to focus on as we work to better understand the dynamics of collaborative small groups. By analyzing video data of this group, this study aimed to understand how Jessica negotiated her, albeit infrequent, episodes of participation in on-task discussion. Using positioning theory as the primary analytic framework, the analysis illustrates how Jessica negotiated on-task participation opportunities by establishing access to the conversational floor and/or positioning herself with authority in off-task discourse and leveraging that to negotiate access to the group's on-task discourse.

I. INTRODUCTION

Curricula and pedagogical strategies emerging from physics education research include a lot of student talk, including small group work. We know that providing students opportunities to engage in authentic collaborative sensemaking discussions improves learning outcomes [1–3]. However, these small group discussions are not always beneficial for all students. While small groups can create space for productive discussions, they sometimes function inequitably, with some students not receiving fair access to learning opportunities or positive identities [4–5].

Research into small group dynamics rarely attends to low participation students or off-task talk [e.g. 6–8]. In some sense this is reasonable, it’s difficult to analyze the absence of the thing being analyzed – discussion – and because we’re interested in content learning outcomes we focus on students talking about content. But students who rarely participate should concern us. Further, research from the math ed. community argues off-task discussion can support greater equity in learning outcomes in small group work, including studies suggesting off-task participation may be particularly important for low-status students [9–11].

This paper reports an early finding from a larger study of one infrequently participating student in a collaborative small group. The focus student, Jessica (all names are pseudonyms), is consistently the least frequent participant in her relatively inequitable group. Assuming participation in on-task discussion is necessary for access to learning opportunities and positive identity development, this study investigates whether and how Jessica’s participation in off-task discussion supports her access to on-task discourse.

II. THEORETICAL AND ANALYTIC FRAMEWORK

Equity in collaborative small groups needs theoretical description. In describing their analytic framework for equity in small groups, Shah and Lewis [4] argue that an equitable small group is marked by *participatory equity*, “...the fair distribution of both participation opportunities and participation itself...” (p. 423). This suggests concern when considering infrequent contributors. While it would be unreasonable to expect precisely equal participation, large disparities in participation suggests an equity concern.

Another useful theoretical characterization of equity in collaborative small groups is Esmonde’s [12]; she defines a small group as equitable when all group members have fair access to (1) disciplinary content and discourse practices and (2) positive identities as knowers and doers of the discipline. For Esmonde, participation in discourse is the avenue of access, hence her characterization connects to Shah and Lewis’. Based on these theoretical characterizations, I argue understanding the participation of rarely participating students may help us support more equitable small groups.

Access to participation opportunities is the outcome of an ongoing social negotiation among peers and sometimes

instructors. That is, how a student participates is afforded and/or constrained by a social negotiation in the group. Positioning theory (PT) serves as a theoretical basis for this.

PT [13–14] asserts that in social situations individuals are positioned and re-positioned in existing cultural storylines by communicative acts, typically speech acts though non-verbal communicative acts are also relevant. Storylines are cultural scripts that contain tacitly understood positions. For example, a relevant storyline is formal schooling. Within that storyline are both formal (sometimes called “moral” in the PT literature) and informal positions. Relevant formal positions are teacher, student, and perhaps teaching assistant (TA). Formal positions can be understood as informal types. The strict teacher or the cool teacher are tacitly understood positions. There are similar informal student positions.

Crucially, how one is positioned within a storyline impacts access to participation opportunities, disciplinary content and discourse practices, and positive (or negative) identities. As a tool for analysis, PT requires a close focus on communicative (speech) acts, identifying how they function to position individuals within storylines and then attending to how those positions afford or constrain access.

The *influence framework* developed by Engle et al [15] has been a useful complement to PT analysis when attending to equity and participation in small group discussions. This framework is the product of an effort to theorize how an individual’s influence unfolds during persuasive science class discussions. While PT is not mentioned in their work, Engle et al view an individual’s influence as the outcome of an ongoing social negotiation and something that can change over time. These foundational assumptions are consistent with how positions are negotiated in PT.

The influence framework identifies four components that interact to result in an individual’s level of influence: (1) the negotiated merit of each participant’s contributions; and each participant’s negotiated (2) degree of intellectual authority, (3) access to the conversational floor, and (4) degree of spatial privilege. The third, negotiated access to the conversational floor, connects to Shah and Lewis’ notion of participatory equity, and hence to Esmonde’s view of equity.

Engle et al identify features of persuasive discussion that provide evidence of shifts in these components. For example, an individual’s socially negotiated access to the conversational floor is seen by the ability to self-select to speak, finish turns without being interrupted, and affecting others’ access to the conversational floor. In addition to paying attention to positioning, the analysis attended to evidence of access to the conversational floor.

III. DATA SOURCE

The data is video of rising first-year college students in collaborative small group interactions in a science learning context. It was collected during a pre-orientation program for science interested students with under-represented identities

[16]. The goal of the program was to increase retention among its participants. The pre-orientation portion of the program enrolled 20 students for 9 days immediately prior to the college's orientation for new students. During the mornings, participants engaged in small group investigations about the mechanisms of climate change. While not formally a college science class, the morning sessions functioned very much like one. A group of researchers collected video of as much activity as possible, including recording each small group on all days.

During the first three days of the program, small groups were assigned. At the beginning of the fourth day, students were instructed to arrange themselves into new groups, and those groups were together for the final six days of the program. This study focuses on one group from that period. The group had four members. They were (with available demographic information) Jessica (white, female, deaf/HoH), Pat (white, non-binary [she/they], deaf/HoH), Justin (white, male), and Brittany (biracial [Native American/Hispanic], female). Jessica has cochlear implants and communicated exclusively by talking within this group. She was also fluent in American Sign Language (ASL) and communicated with other deaf students in the program in ASL. Pat had hearing aids and there is no evidence of ASL fluency; she communicated exclusively by talking.

This group has been the focus of several previous studies [17-19]. That work characterizes the group as usually, though not always, functioning inequitably. Justin typically dominated the group's decision making and he talked the most. The target student of this study is Jessica. Jessica is of particular interest because she is the most marginalized member of this inequitable group. A previously published analysis [17] aggregated talking time for each group member in 5 or 6 five-minute long segments from each of four of the six mornings (two days were excluded – Jessica was absent one day and complete video is not available from another day). Across the four analyzed days, Jessica averaged 7.2% of the student talking time, with her lowest day being 5.3% and her highest being 10.7%. The other group members averaged 52.0% (Justin), 25.2% (Brittany), and 15.5% (Pat). The rank order of students by percent talking time was the same on all four days, indicating stability in each student's relative quantity of talk.

Jessica's participation was analyzed across all of the small group activities, about 10 ½ hours of video. A little more than 8 hours is from the five mornings Jessica was present. A little over 2 hours is from afternoon small group activities, though most afternoon activity was individual or whole group work. The primary focus of the study is on the mornings, since that activity was science learning.

IV. METHODOLOGY

In the spirit of self-reflexivity and before I present the methodology and results, I acknowledge my standpoint as an educated, white, able-hearing, male. The privileges

associated with those identities can and do constrain my sense-making of the experiences of the study's participants. This is particularly important to acknowledge because this is a single-author study.

Analysis involved iterations of viewing and making sense of the video. It began with a first viewing of all of the available video. During that pass something similar to fieldnotes were written to create a record of the group's activity with some emphasis on Jessica's participation. After watching the video from a day, I wrote a reflective analytic memo about what stood out that day and why, and recorded/explored questions the video raised. The second viewing pass focused on the morning videos. Notes from the second pass were a more detailed description of Jessica's participation and also zoomed in on episodes related to themes and questions that emerged in the first pass memos.

During the second pass, interesting patterns emerged. This paper reports the further analysis and findings of one of those, the relationship between episodes of Jessica's participation in on-task discussion and her participation in the discussion, usually off-task, that preceded them. As explained below, this study focuses on the first morning the group was together. With that focus, a third viewing pass of the video from that day, about 2 hours of video, was done. The group's discussions were coded as on- or off-task and Jessica's participation, when it occurred, was characterized. On-task discussion was talk specifically about the tasks, data analysis, and ideas the instructor asked the groups to consider. Any talk that was not on-task was coded off-task.

It made sense to focus on the first day because there was a lot of off-task discussion and parsing episodes of on- and off-task discussion was more straightforward than other days. Probably because the students were allowed to self-assemble into groups, these four students came together with some level of existing friendship. Consequently, their off-task discussion and activity flowed easily. The assigned activity on this day also made on-/off-task coding easier. The task required taking and recording a temperature reading every five minutes for over an hour, so there was a lot of time between temperature readings for off-task discussion. Further, there was nothing to make sense of until they had collected most of the data. So for the first hour, on-task discussion occurred only around taking and recording temperatures and when the instructor or a TA prompted it. Off-task discussion was plentiful and transitions between on- and off-task discussion were usually abrupt.

During the 110 minutes the group was together, the coding identified 28 episodes of on-task talk by students. 10 of those 28 were when one or two students announced the temperature reading to the others and included no on-task talk beyond that. Because those quickly became routine and involved no additional discussion, they were removed from analysis. A few did include additional discussion; those were kept in the group of episodes for analysis.

The 18 analyzed episodes were transcribed; transcripts usually included a short period before the on-task discussion

and the on-task discussion. The length of the “short period” varied. The detailed notes and re-watching portions of the video determined how much was needed to characterize Jessica’s participation leading into the on-task episode. They ranged from 1 to 5 minutes, though in some cases Jessica did not participate at all or had only a single word contribution or two, so no transcript of the lead up was necessary.

Using the transcripts and video, Jessica’s participation was analyzed through the lenses of PT and the influence framework. Jessica’s participation prior to on-task episodes was characterizable by one of three descriptions: (1) evidence of establishing access to the conversational floor and/or being positioned with social authority, (2) active evidence of a lack of access to the conversational floor [e.g. contributing to a conversation with no evidence others attended or responded to her] and/or positioned as lacking social authority, and (3) complete lack of or minimal participation [e.g. only nodding agreement or saying “yeah” in response to someone else]. Characterization of the on-task episodes included who initiated them. For the on-task episodes in which she did participate, Jessica’s participation was analyzed through PT and the influence framework.

V. RESULTS

The first thing that stands out is Jessica’s participation in on-task episodes correlates strongly with who initiated them. Of the 18 analyzed episodes, students initiated 9 and either the instructor or a TA initiated 9. In all of the instructor/TA initiated on-task episodes, Jessica did not participate in *any* on-task discussion beyond nodding agreement or an occasional “yeah”. Some of those episodes were short, on the order of 30 seconds or less, but a few were lengthy, up to 8 minutes in one case. Jessica’s participation in the group’s off-task discussion before those episodes is varied, ranging from establishing access to the conversational floor to not participating at all. However, the fact she did not participate in the subsequent on-task discussion suggests no relationship between her off- and on-task participation when the instructor or TA initiated the conversation.

However, during student-initiated on-task discussions, a pattern does emerge. If Jessica participated in the group’s discussion that preceded an on-task episode, whether she was able to establish some access to the conversational floor or not, she typically contributed to the subsequent on-task episode. Jessica participated immediately prior to 7 of the 9 student-initiated on-task episodes and went on to participate in 6 of those 7. For the 2 episodes when she did not participate immediately prior, she did not participate in the subsequent on-task discussion.

Of the 6 on-task episodes Jessica participated in, the nature of her participation in what preceded it – whether or not she was positioned with authority/ negotiated access to the conversational floor – did not matter. That is, if she talked before the on-task episode she typically (six out of seven times) talked during the on-task episode.

However, her negotiation of status or access preceding an on-task episode was consequential in a different way. It appeared to impact how Jessica’s contributions to the on-task discussion were taken up by her classmates. If Jessica had established access to the conversational floor in the discussion leading up to an on-task episode, that access carried over into the on-task episode and her classmates attended and responded to her contributions. But if she had not established access prior, her contributions to the on-task discussion were ignored or quickly dismissed.

Among the 6 on-task episodes Jessica participated in, 4 were preceded by her participation in discussion that showed evidence of her having access to the conversational floor and in a couple cases also being positioned with authority. There is evidence in all four of the subsequent on-task episodes of Jessica having access to the conversational floor and in two she is positioned with authority by another group member. In all four cases her participation in the subsequent on-task activity was attended to and responded to by one of more group members. In contrast, in the two on-task episodes preceded by evidence of poor access to the conversational floor, her contributions to the on-task discussion were either ignored or quickly dismissed without discussion.

What follows are brief illustrations of both situations, beginning with an example off the latter. About 20 minutes into the morning session, Justin initiated an off-task discussion topic; he commented on the awkwardness of first meeting his dorm floor’s resident adviser (RA) while brushing his teeth in the bathroom. Brittany responded by noting that another student told her a similar story. At that point Jessica, who was sitting between Justin and Brittany, attempted to enter the conversation. It appears she began to say she had not yet met her RA, though she stopped abruptly because she was quickly talked over. None of the other three group members shifted their gaze to Jessica and Brittany talked over her, describing the other student’s story to Justin. When Brittany completed talking, Justin responded to her. Then Pat, who was focused on their phone during this time, got Brittany’s attention and held the phone screen up to her so she could see what was on it. Brittany smiled, and both Jessica and Justin leaned in to see it. Pat moved the phone toward them and they both smiled. This illustrates Jessica participating, or at least attempting to participate, in the group’s off-task discourse, but not being able to negotiate access to the conversational floor. She attended and responded to others, but when she attempted to contribute a comment it was not attended or responded to. Note the three other group members all made bids to shift the conversation and were attended to and responded to by others.

Immediately after Pat leaned back from showing their phone to Jessica and Justin, Jessica attempted to prompt the group to take a temperature reading. This is an example of a student-initiated on-task episode with Jessica initiating. She said “We have to record now.” Justin and Brittany had begun quietly singing along with a song playing on their laptop; they continued singing and did not shift their gaze to Jessica

in response to her comment. Pat did orient to Jessica, giving her a quizzical look – raising their eyebrows. Jessica gestured, as if writing in the air with her pen, presumably to communicate the need to record the temperature. Pat said “not yet” and immediately shifted their gaze away from Jessica to a notebook on the table in front of them. Only one of three partners attended to Jessica and that response was brief and negative. About 15 seconds later the group’s timer went off and Pat and Justin announced the temperature reading. It appears Jessica prompted the reading a bit early, and Pat chose not to announce the temperature. This illustrates Jessica not establishing access to the conversational floor prior to an on-task episode and then having her contribution quickly dismissed during on-task talk. In a later instance Pat announced a temperature before the timer went off on their own.

Another episode, from about 10 minutes earlier, illustrates the converse phenomenon, Jessica negotiating access to the conversational floor and being responded to by her partners during on-task discussion. Shortly before the group took their first temperature reading, there were a series of three instances in less than 90 seconds of Jessica being positioned with authority and/or demonstrating access to the conversational floor in off-task discussion.

The second of those three occurred when the group was about to turn on the heat lamp, which was the beginning of data collection. As the instructor walked up to the group, Justin reached across the table to reposition a piece of white foam in the data collection apparatus. The following exchange occurred:

Justin: All right so we’re starting [slides a piece of white foam further under an inverted tank]

Inst.: [to Justin, interrupting him] Actually you can leave the foam exactly how it was

Justin: Oh really?

Inst.: Yup, it was all set up for you, all you have to do is click on the light and it’s good to go

Jessica: [sarcastic tone] Wow, Justin

Brittany: [similar tone] Justin, you ruined it

Jessica: C’mon Justin

Justin: Ok, just, I thought, come on (several inaudible words), okay ready? [reaches to turn light on]

Here, Jessica initiated teasing Justin, and Brittany echoed that. Justin responded to their teasing. In contrast to the earlier off-task episode, Jessica’s attempt to initiate a conversational focus was taken up by two other students. This is evidence of access to the conversational floor; Jessica self-selected to speak and was able to finish her turn without being interrupted. Teasing like this was fairly common in this group, especially teasing Justin. It seems likely this was a type of off-task conversation that aimed to resist Justin’s hegemony within the group [10]. Through the lens of PT, it can be seen as Jessica and Brittany (somewhat jokingly) positioning Justin as not competent.

Shortly after the third instance of Jessica establishing access/being positioned with authority, Justin picked up the digital readout to announce the group’s first temperature reading and noticed it read out in Fahrenheit. He seemed upset, fretting about the need to convert the reading to Celsius. Jessica quickly and loudly agreed Celsius was the scale they needed to use, but Pat stated it didn’t matter and said they preferred to use Fahrenheit. In a lively and loud discussion Jessica and Justin argued that science was done in Celsius. The volume of the discussion attracted the instructor to the table. When he arrived, Jessica appealed to him to weigh in on “Which one’s better?” When the instructor paused, probably to allow the students to continue discussing the question, Jessica again appealed for him to weigh in, which he did.

Given Jessica’s lack of participation in instructor/TA initiated on-task episodes, this event seems notable due to her initiation of an on-task question to the instructor. While that participation is probably a positive, we should recognize a possible cause for concern related to gender equity. It was Jessica’s male classmate who dominated the activity and brought up the temperature scale issue and Jessica’s appeal to the instructor to provide an authoritative response was addressed to another male person. So, while this was an episode of substantial participation in the group’s on-task discussion, it is difficult to argue Jessica had fair access to a positive science identity.

VI. DISCUSSION

To be clear, Jessica’s infrequent participation is not due to some deficit on her part. In fact, it is clear throughout this day that Jessica understands what the group is doing. In two instances she corrected a group member who began to do something incorrectly. Jessica’s challenge to participate on this day arose from the social negotiation of how she was positioned and her access to the conversational floor. Hence, the occasions when Jessica successfully negotiated access to the conversational floor during on-task discussion are the interesting bits – even when the discourse she participates in is not as equitable as we hope. The notable finding related to that is Jessica’s status in off-task discourse prior to an on-task-episode correlated with her ability to negotiate access to the conversational floor during the on-task episode.

While this is a study of one person and one group on one day, that finding seems worth considering. Jessica was responded to in four on-task discussions that day, and *all* were preceded by her establishing access in off-task discussion beforehand. Further, there are similar findings in math ed. research including evidence of the particular benefits of off-task discourse for low-status students [9-11]. The fact this route of access to participation opportunities may be especially relevant for students who are marginalized suggests research attention to off-task discourse may be important to supporting more equitable collaboration in small groups.

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