When teams misunderstand: Ambiguous language and teamwork

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Abstract

A key aspect to the successful performance of student teams is communication. Student teams negotiate many aspects of collaboration, including deadlines, meeting times, and expectations. Previous works have found that the different meanings which people place on commonly used words or phrases often lead to miscommunications in the professional workplace. It is unknown, however, how this situation translates to the collegiate setting, specifically on team-based projects, the manners that this could potentially affect the progress of the students, and if there are any differences in interpretation of these phrases that are along demographic lines. In this student-directed project, participants (n=119) of varying technical backgrounds were surveyed as to their interpretations of ambiguous teamwork-relevant phrases. Participants were provided a series of scenarios typically encountered in student teams involving the use of an ambiguous term and were then asked to infer what this piece of language meant based on a selection of multiple choice answers. This mixed-methods study investigates whether there are demographic differences regarding interpretation of ambiguous team-based language. The demographic groups that had the largest differences in perception of the ambiguous terminology were age and experience level. That is, there were significant differences in interpretation between students and non-students, and between participants aged 18-24 and participants older than 24. Contrasting language perceptions between genders did not demonstrate statistically significant differences, and there were not enough respondents of varying racial or ethnic backgrounds to analyze this type of demographic. These results will potentially suggest the importance of clarification of commonly misinterpreted terms in the classrooms, and will provide evidence demonstrating the misinterpretations perceived across age groups and levels of student status.

Introduction

Group-based learning is a common aspect of undergraduate engineering curricula, and is a critical part of both first-year introductory engineering courses and senior-level capstone design courses at many institutions across the country and around the world. Previous educational works have cited that poor performance, low motivation, and negative emotions on both student and professional teams can be linked to misunderstanding caused by communication errors, specifically differences in how individuals interpret language used by team members [1][2][3]. A source of this problematic interpretation results from use of ambiguous terminology, often related to probability (i.e "probably", "maybe", "often", "unlikely") or time (i.e "ASAP", "soon", "right away"), but can also include other wording that is somewhat vague in understanding ("good", "alright", "bad"). Brewer and Holmes previously investigated ambiguous terminology and the variability of responses across both probability and time-based language ambiguity and whether a relationship existed across demographics (specifically cultural upbringing, age, and gender). Their study involved a sample of 345 undergraduate business students and also involved the implementation of an instructor-led exercise to help counteract

miscommunication errors due to ambiguous language [4]. While the results of their study demonstrated that there was not a significant relationship between the tested demographic groups and their interpretation of ambiguous language regarding time and probability; a gap exists as to whether or not ambiguous language has a similar effect in the STEM community and what the effect would be across more encompassing demographics. This study attempts to experimentally determine if there exists differences regarding the interpretation of ambiguous probability and time related terms in a group setting across gender, ethnicity, student status, and age. Specifically, our research question is:

Are there differences in interpretations of ambiguous team-based terminology occurring across demographic groups?

Methods

Survey
Data for this study was collected via an electronic survey, where participants were provided with five different situations encountered on teams that use ambiguous language choices and then asked to choose a multiple choice answer that best described *their interpretation* of the statement. An example of a prompt provided in the survey can be seen in Figure 1 all prompts included in the survey can be found in Appendix A.

*A team member states that they will be **late** to your group meeting, when do you estimate that they will arrive after the meeting has begun?*

| 1.) < 5 minutes | 2.) 5-10 minutes | 3.) 10-30 minutes | 4.) 30-60 minutes | 5.) 60-90 minutes | 6.) >90 minutes |

Figure 1. An example of a prompt involving an ambiguous term in relation to time

Participants were asked to provide a rationale for their choices and list if any previous experience or external information guided them in the decision process, then the data was sorted based on the demographics reported by the respondent (gender, race, age group, and student status). Due to the lack of variation in ethnic backgrounds of participants, this demographic had to be modified, such that we no longer investigated across multiple ethnicities and instead combined all respondents that did not identify as White / Caucasian into a 'Persons of Color' category and compared them with participants that did identify as White / Caucasian.

Participants
Respondents were recruited in a non-random convenience sampling format. Authors sent an inquiry to various on-campus academic research groups, off-campus academic forums, previous and current student bodies, and general peers to complete the survey and in exchange be placed in a raffle for one of four $15 gift cards to Amazon Marketplace. Our final sample included 119 participants; demographics can be observed in Table 1.

Table 1. Demographics of respondents (N=119)

Demographics – 119 respondents	Number	Percentage
Gender		
Female	58	49%
Male	60	50%
Other	1	1%
Ethnicity		
Caucasian/ White	85	71%
Asian	22	18%
Hispanic / Latino	6	5%
African-American / Black	5	4%
Other	1	1%
Discipline		
Engineering Related	102	85%
Non-Engineering Related	17	15%
Occupation		
Professional	16	13%
Student	103	87%
Age		
Under 18	1	1%
18-24	103	86%
25-34	10	8%
35-44	3	3%
45-54	1	1%
55-64	1	1%

Results

To better understand respondents' interpretation of the ambiguous language choices, we visualized the responses to each question as a stacked bar chart. Figure 2 presents respondents' choices regarding how they would interpret each ambiguous word or phrase involving a question regarding the ideal time to send an additional prompt in a group messaging platform called GroupMe after you have asked a question and no one has responded.
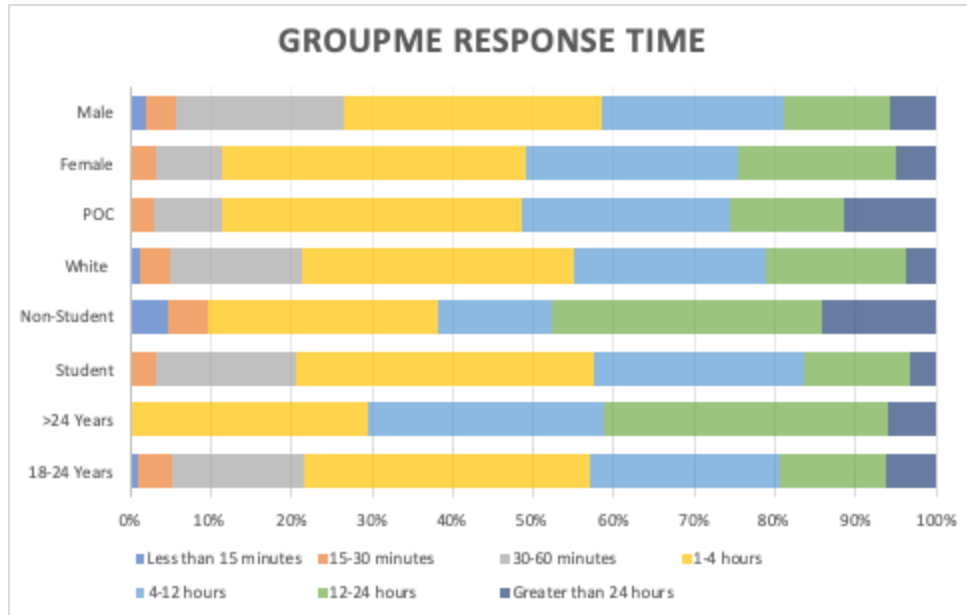
Figure 2. The variation of response based on the demographics of the respondents for the prompt regarding GroupMe *response time.*

Perhaps the most important message of the above figure is that there is not a universal interpretation of any of these phrases. There are a number of people on both ends of each spectrum. Misunderstandings about any of these items have the potential to cause major issues on student teams, yet clearly people do not share a single interpretation of what any of these items mean. A common example of this idea is a deadline, where one party - either a teammate, supervisor, or instructor - expects to receive an assignment at a certain time, whereas the other party perceives a deadline as time they have until they need to submit an assignment. This interpretation difference can cause conflict between parties as what is deemed responsible and respectful by the former party may not be understood by the latter.

We created similar charts to Figure 2, disaggregating by identity characteristics as our sample allowed. In general, not only were differences non-significant, they were surprisingly minimal. While there is a lot of within-people variation, as the figure shows, there is not a lot of between-group variation. All additional prompts demonstrating response variation can be found in Appendix B.

The single exception to this general finding - that there is a lack of differences between demographic groups in how they interpret these ambiguous words or phrases - is in responses to the same prompt demonstrated by Figure 2 regarding a response to a question in a group chat. Older adults, categorized as any participant over 24 years, wait longer than younger adults (ages 18-24) (p= 0.008). The pattern between the two age ranges can be more easily compared in Figure 3.
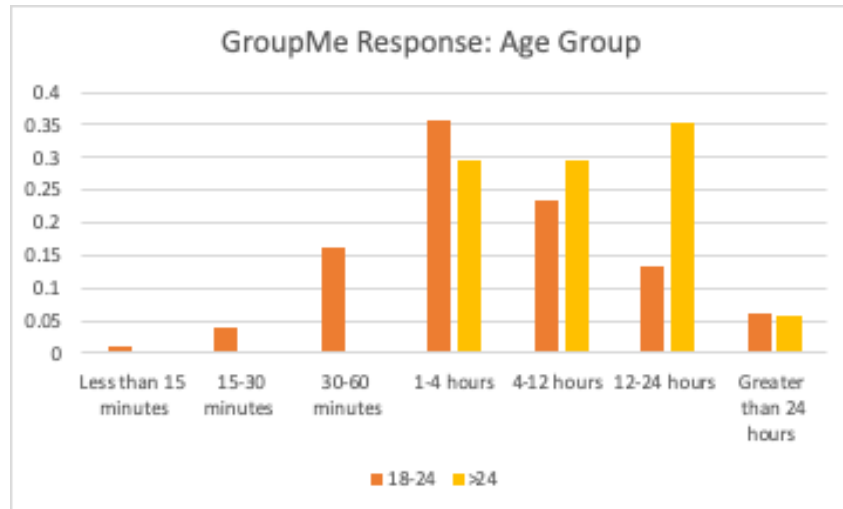
Figure 3. The variation of response regarding when to send an additional prompt in a GroupMe between varying age ranges

As is clearly seen in the figure, respondents' age is significantly related to how long they would wait to respond to a question in a group message. A difference amongst respondents based on age is perhaps not surprising; GroupMe is a fairly new communication technology, and it is likely that respondents have had very different experiences with it. In contrast, while other technologies have changed in recent years, we expect their use has changed less.

Discussion

This study finds that there is little relationship to how demographic groups - specifically ethnicity, gender, age range, or student status - interpret ambiguous language related to time and probability in team settings. Specifically, only one of the five prompts demonstrated significantly different interpretations across the age and student status demographic. This finding, however, does not encapsulate the extreme levels of variation witnessed across demographic groups in the various prompts within this study, as noted in Appendix B and C. The variation suggests that ambiguous terminology elicits extremely different interpretations in both collegiate and professional settings; however, interpretation cannot be predicted based on demographics.

As a result, educators must take measures to teach students about ambiguous terminology and how teammates can perceive both time and probability based vague language completely different from one another. Having a conversation about varying interpretations of ambiguous language before beginning group projects is critical to reducing issues related to miscommunication on teams, and even using Figure 2 and Appendix B as a tool to present to students to demonstrate the variation of language interpretation could prove to be useful. Limitations of this study primarily include the need for a broader pool of participants in order to better represent various demographic groups. Due to the low number of respondents identifying as Black/African-American, Hispanic/Latino, and Asian/Pacific Islander, we were unable to compare across specific ethnicities and were only able to compare the groups by combining the aforementioned ethnicities into a 'People of Color' demographic to compare against White

respondents. In addition, as age group was the only demographic that demonstrated significant differences, researchers would have liked to gain more representation from participants over 24 years, as the 18-24 age range encapsulated 86% of the participants in this study as reported in Table 1. The survey was circulated primarily in university-related forums where members are predominantly undergraduate or graduate students.

This study's results are similar to those of Brewer and Holmes [4], which is surprising due to its publication date being prior to the incorporation of group communication and editing software into the classroom. Over ten years ago, student teams primarily communicated face to face or via electronic mail communication; in contrast to classrooms today, which often utilize software including GroupMe, WhatsApp, Google Suite, and potentially Facebook to do a fair share of communication during the course of a group project. It was expected that the shift from primarily verbal communication to significant electronic communication would have some type of effect on the results of this study, whether it is because tone cannot be perceived appropriately electronically or that students would have confidence to question vague terminology as it is less conflict-based in an electronic forum versus in person. This was proven to some effect due to the statistically significant differences between age groups on the question regarding the response to a GroupMe message, where the 18-24 year olds generally selected response times that were much shorter than the time periods chosen by respondents above the age of 24. The differences in language interpretation across age groups or generations could prove useful to better understand communication between students and instructors in a university setting, and provide even more insight in a professional setting when communicating with coworkers across generations.

Future research should further investigate the role of group-based educational advancements on ambiguous language interpretation, as new technology can gain popularity amongst collegiate students very quickly. During the conclusion of this study, researchers even learned that yet another new team-based communication software is becoming popular on project teams and higher educational institutions. In addition, further research regarding the interpretation of ambiguous language between native and non-native English speakers should be explored, as this is becoming a prevalent topic within collegiate communities and this study was unable to test this demographic [5].

References

[1] Coupland, N., Wiemann, J.M., and Giles, H. "Talk as a 'problem' and communication as 'miscommunication': An integrative analysis," in *Miscommunication and Problematic Talk.*. Newbury Park, CA, USA: Sage, 1991, pp. 1–17.

[2] Janicki, K. "A hindrance to communication: The use of difficult and incomprehensible language," *Int. J. Appl. Linguist.*, vol. 12, no. 2, pp. 194–217, 2002.

[3] Brewer, E.C., & Holmes, T.L. (2016). Better Communication = Better Teams: A Communication Exercise to Improve Team Performance. IEEE Transactions on Professional Communication, 59, 288-298.

[4] E. C. Brewer and T. L. Holmes, "Obfuscating the obvious: Miscommunication issues in the interpretation of
common terms," *J. Bus. Commun.*, vol. 46, no. 4, pp. 480–496, 2009.

[5] M. Humes and A. H. Reilly "Managing intercultural teams: The eorganization exercise," *J. Manage. Educ.*, vol. 32, no. 1, pp. 118–137, 2008.

Appendix A

The list of multiple choice questions asked in the ambiguous language block of the survey can be found below.

*At the beginning of the semester, your team decides that you all should meet **regularly** to complete group assignments and lab reports. How often should your group be meeting?*

| 1.) Multiple Times per Day | 2.) Daily | 3.) Multiple Times per Week | 4.) Weekly | 5.) Bi-weekly | 6.) Monthly |

*A team member states that they will be **late** to your group meeting, when do you estimate that they will arrive after the meeting has begun?*

| 1.) < 5 minutes | 2.) 5-10 minutes | 3.) 10-30 minutes | 4.) 30-60 minutes | 5.) 60-90 minutes | 6.) Greater than 90 minutes |

*A teammate asks for your pieces of the report to finalize editing **before** the 11:59pm deadline. When do you need to send your work to your teammate for editing?*

| 1.) < 1 hour before | 2,) 1 hour before | 3.) 2 hours before | 4.) 5 hours before | 5.) 9 hours before | 6.) At least a day before |

*A team member tells you that they want to get a **good** grade in this course. What grade do they want?*

| 1.) C- | 2.) C to C+ | 3.) B- | 4.) B to B+ | 5.) A- | 6.) A to A+ |

*You post a question about open lab in your project team's group chat, but no one has answered. After what length of **time** would you send an additional prompt?*

| 1.) Less than 15 minutes | 2.) 15-30 minutes | 3.) 30-60 minutes | 4.) 1-4 hours | 5.) 4-12 hours | 6.) 12-24 hours |
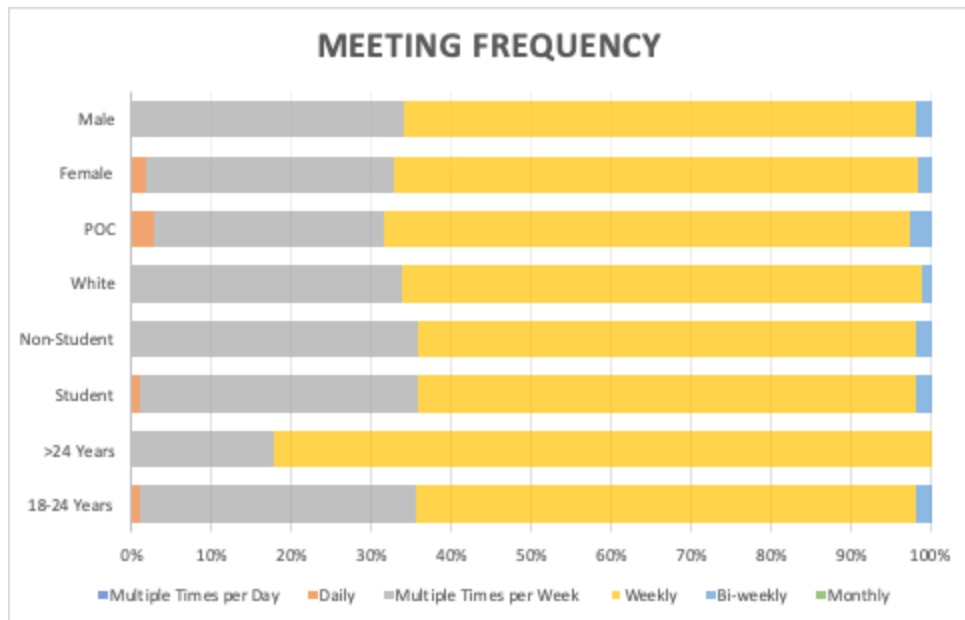
Figure B-1. Response variations across demographics based on the prompt regarding *regular* meeting times
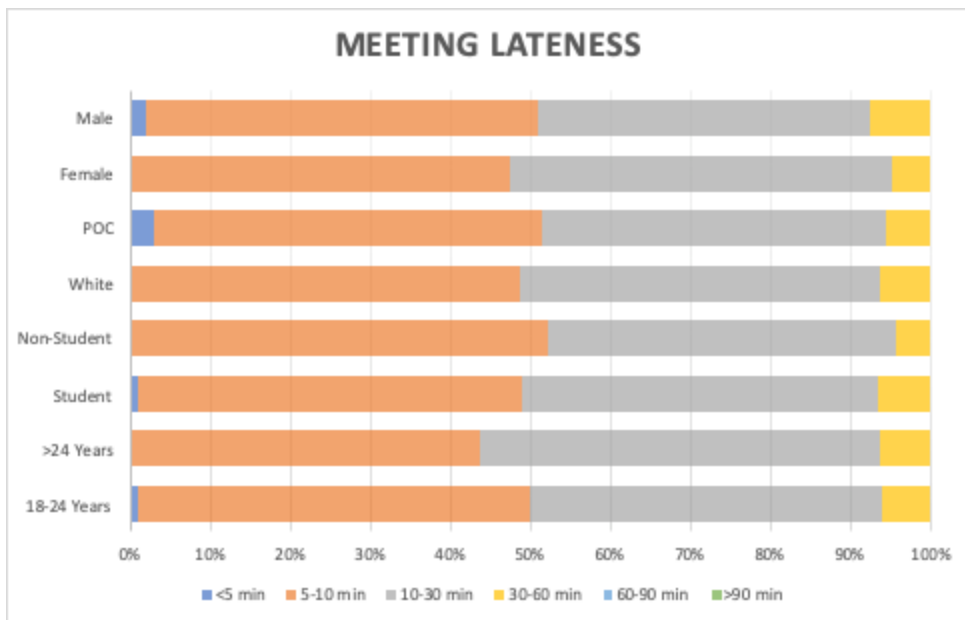
Figure B-2. Response variations across demographic based on the prompt regarding a team member being *late* to a group meeting
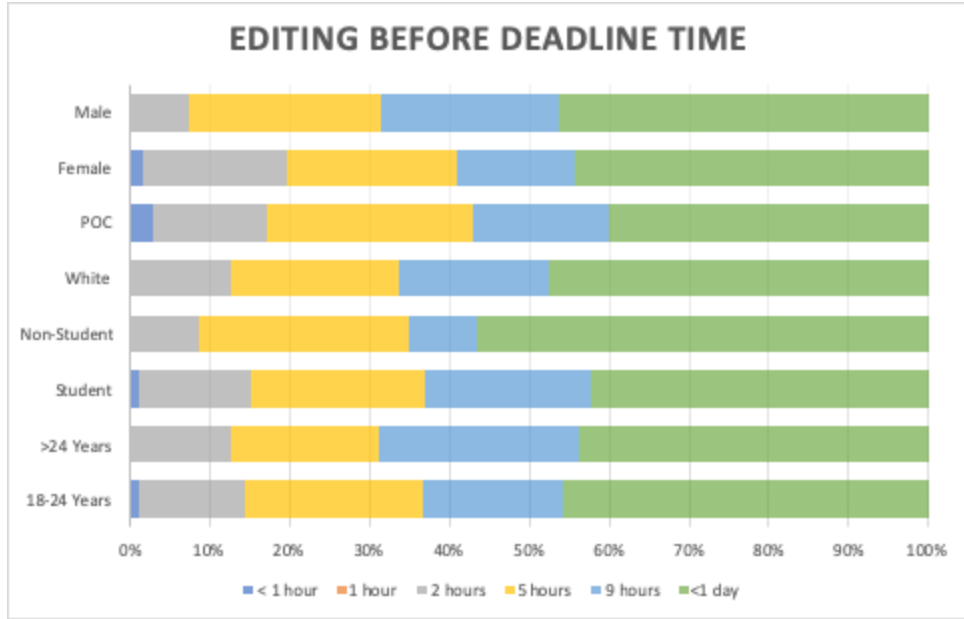
Figure B-3. Response variations across demographics based on the prompt regarding editing *before* a project deadline
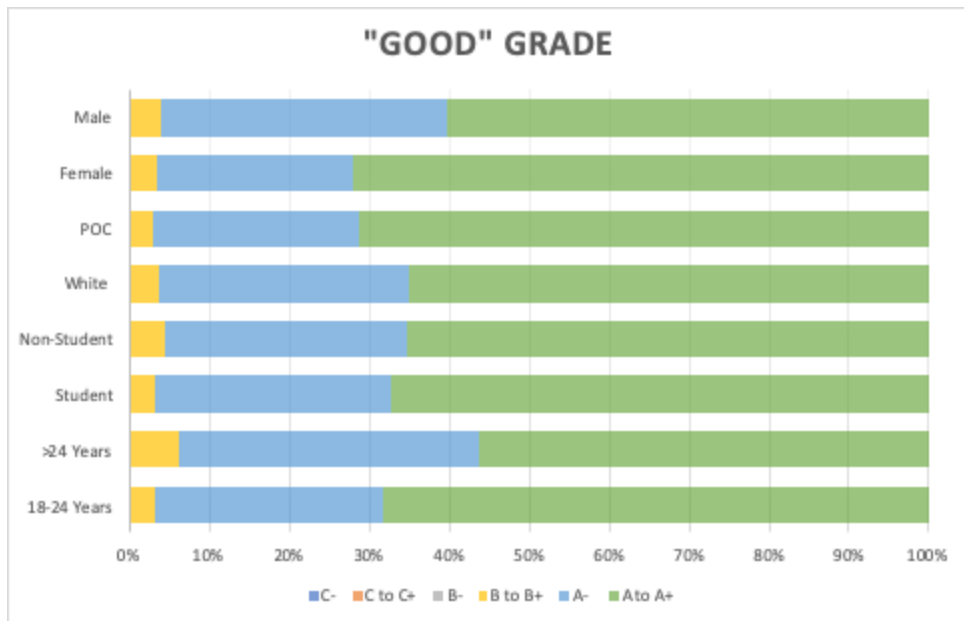
Figure B-4. Response variations across demographics based on the prompt regarding a teammate's statement about a *good* grade for the course
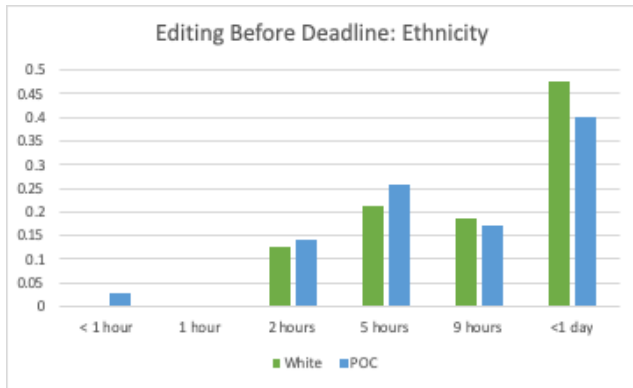
Appendix C
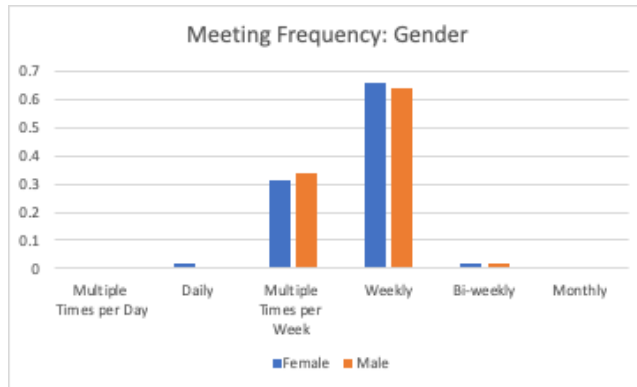
Figure C-1. A comparison of response variations by ethnicity for the meeting frequency prompt
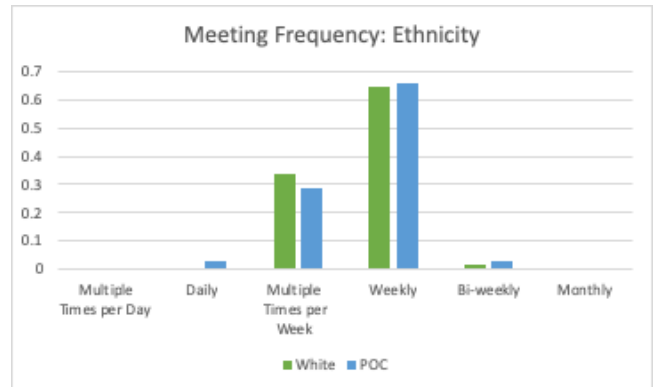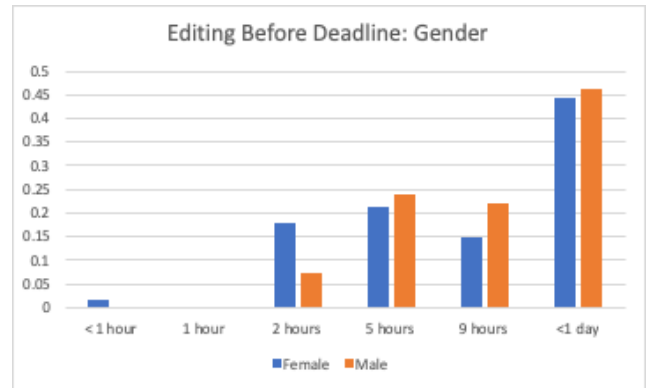

Figure C-2. A comparison of response variations by gender for the meeting frequency prompt
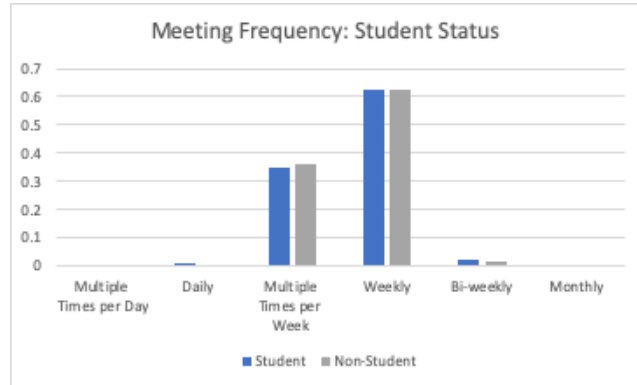
Figure C-3. A comparison of response variations by student status for the meeting frequency prompt
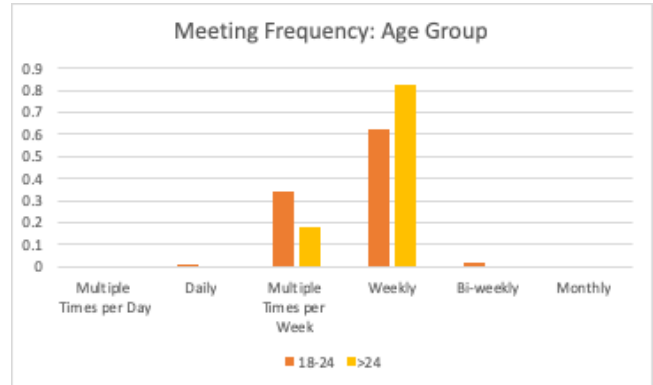
Figure C-4. A comparison of response variations by age range for the meeting frequency prompt
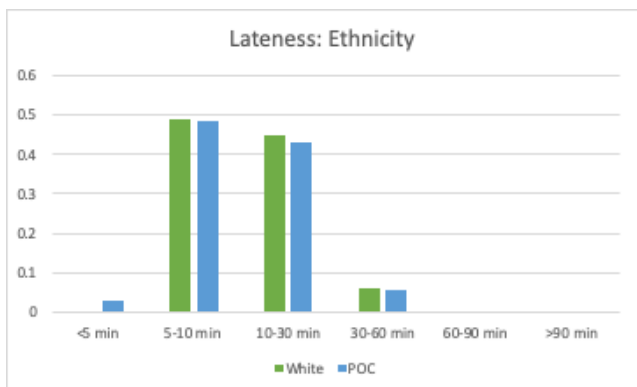
Figure C-5. A comparison of response variations by ethnicity for the meeting lateness prompt
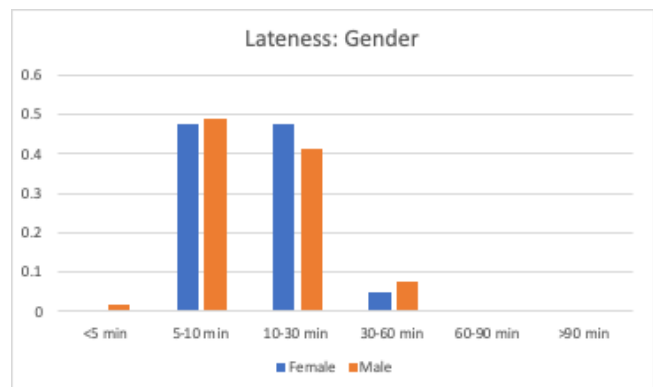
Figure C-6. A comparison of response variations by gender for the meeting lateness prompt
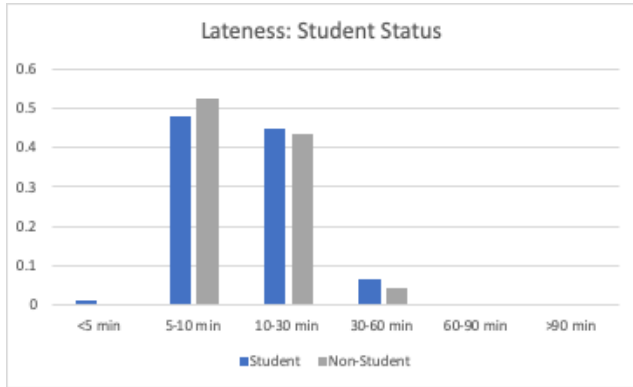
Figure C-7. A comparison of response variations by student status for the meeting lateness prompt
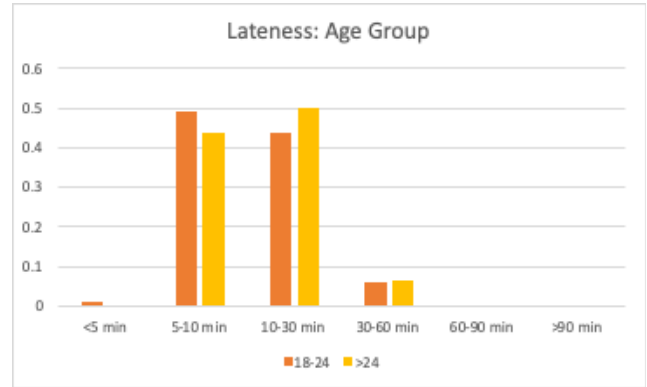
Figure C-8. A comparison of response variations by age range for the meeting lateness prompt

Figure C-9. A comparison of response variations by ethnicity for the latest editing prompt

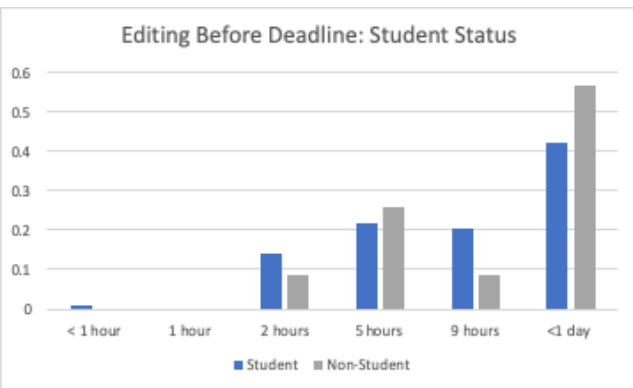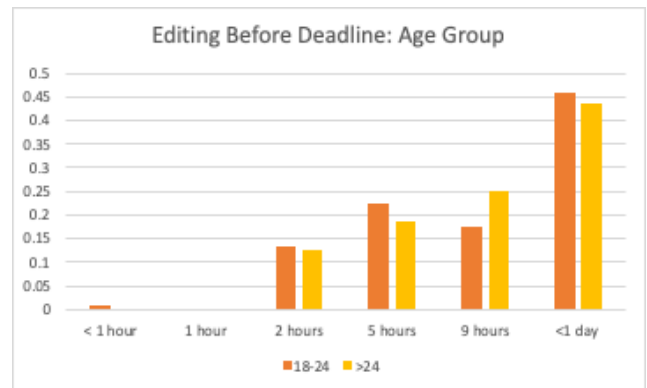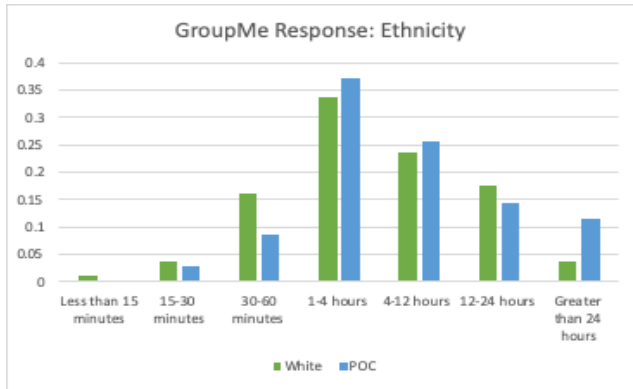**Figure C-10.** A comparison of response variations by gender for the latest editing prompt

Figure C-11. A comparison of response variations by student status for the latest editing prompt

Figure C-12. A comparison of response variations by age range for the latest editing prompt

Figure C-13. A comparison of response variations by ethnicity for the additional GroupMe prompt
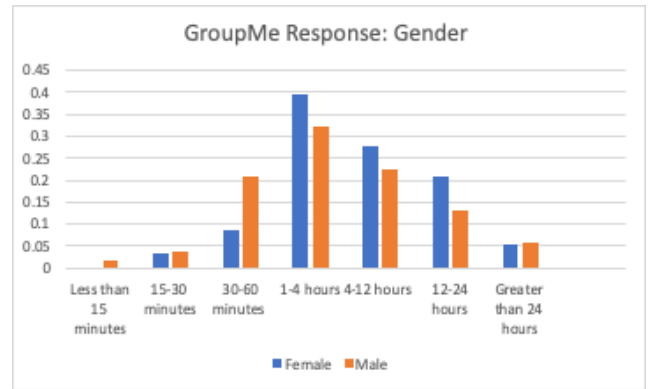

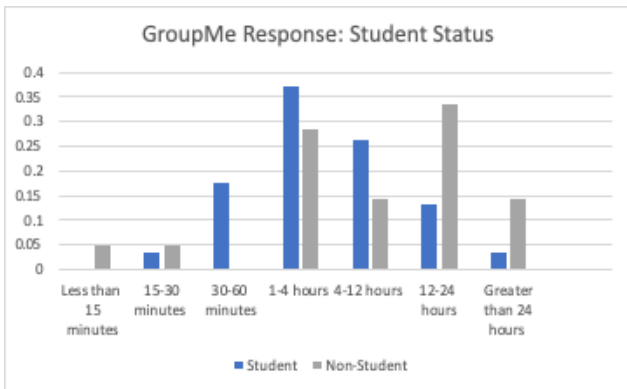**Figure C-14.** A comparison of response variations by gender for the additional GroupMe prompt

Figure C-15. A comparison of response variations by student status for the additional GroupMe prompt
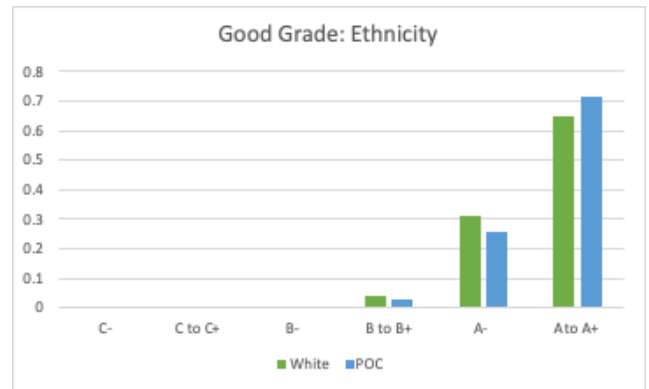

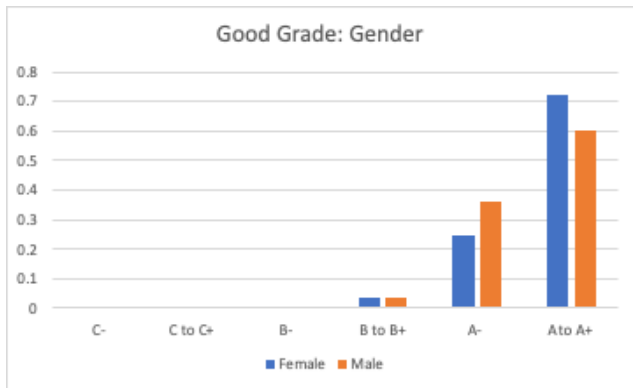**Figure C-16.** A comparison of response variations by ethnicity for the good grade prompt

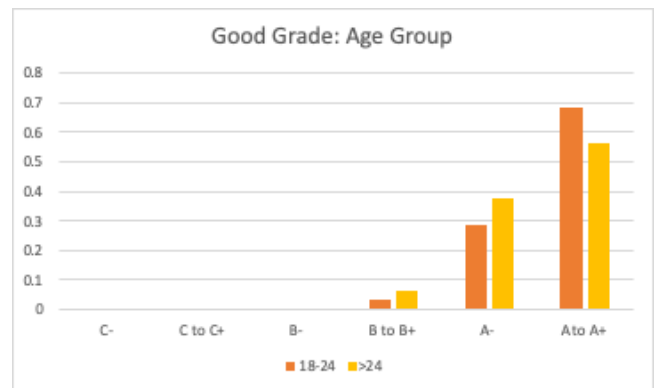**Figure C-17.** A comparison of response variations by gender for the good grade prompt

Figure C-18. A comparison of response variations by age range for the good grade prompt