Phatic Expressions Influence Perceived Helpfulness in Online Peer Help-Giving: A Mixed Methods Study

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Highlights

- Investigated the perceived helpfulness of phatic expressions in online help-giving.
- Phatic expressions overall did not improve the perceived helpfulness of replies.
- Greetings/farewells and other-oriented comments may foster affective engagement.
- Neutral and self-oriented comments may be perceived as unnecessary or discouraging.

Abstract

Background: When struggling students seek academic help in online learning environments, it is important that they perceive the help they receive from others as effective. However, it remains unclear how phatic expressions—comments that are social rather than informative in nature—may help or hinder students who request support for coursework in online settings.

Aim: This exploratory study investigates how phatic expressions influence the perceived helpfulness of online peer help-giving replies in an asynchronous college course discussion forum.

Sample: The participants were 320 undergraduate students enrolled in a large introductory statistics course.

Methods: We used mixed methods to examine how students rated and described the helpfulness of examples of replies to online requests for help, both with and without four types of phatic expressions: greeting/parting tokens, other-oriented comments, self-oriented comments, and neutral comments.

Results: Students perceived help-giving replies with neutral and self-oriented phatic comments as less helpful than those discussing course content alone. They described these comments as unnecessary and potentially discouraging. In contrast, students perceived help-giving replies with greetings/parting tokens and other-oriented comments as equally helpful as those discussing course content alone. They described these comments as kind and contributing to a sense of connectedness.

Conclusions: This study is the first to identify the extent to which different types of phatic expressions contribute to or detract from the perceived helpfulness of online peer help-giving interactions. We expect this work to provide valuable insights for educators and researchers

seeking to foster productive online learning experiences through effective online help-giving interactions.

Keywords: help-giving, phatic expression, discussion forum, online learning

1 Introduction

In educational settings, students develop connections and collaboratively construct meaning about course content through *peer help-giving* interactions, where one student responds to another's request for help (Webb, 1989). Such interactions may be especially important in online higher education contexts because college students enrolled in online courses often struggle to engage meaningfully with their peers, due to factors such as a feeling of isolation, insufficient familiarity with technology, and difficulties balancing coursework with other responsibilities (Farrell & Brunton, 2020; Gillett-Swan, 2017; Wolverton et al., 2020). Recent research has accordingly shown that, in online course settings, help-giving interactions allow students to overcome obstacles to learning (Williams-Dobosz et al., 2021) and build peer-to-peer relationships (Brouwer et al., 2022). Additionally, despite the often-isolating nature of online learning, students can build a sense of belonging and community within their online learning environment when they feel supported academically by others (Chatterjee & Correia, 2020; Lin & Gao, 2020).

Thus, it is important that researchers and educators understand deeply how students can help one another effectively in online contexts. However, there remains a lack of clarity regarding which aspects of students' help-giving interactions are most important for promoting valuable learning outcomes in online course settings (Jeng, Williams-Dobosz, et al., 2023). In the present study, we use mixed methods to examine the influence of *phatic expressions*—comments that are social rather than informative in nature (Laver, 1975)—on the perceived helpfulness of

peer help-giving interactions in asynchronous course discussion forums. By focusing on phatic expressions in the context of online peer help-giving, we aim to address an existing gap in the literature concerning the role that social comments may play in potentially helping or hindering students who are struggling with course material. Ultimately, we expect this exploratory work will provide valuable insights for educators and researchers seeking to model and facilitate online discussions that effectively foster productive online learning experiences.

2 Literature review

2.1 Theoretical framework

The present study is guided by Garrison et al.'s (1999) Community of Inquiry (CoI) framework, which identifies the fundamental components of a successful online learning experience in higher education contexts. The CoI framework identifies three core elements of successful online learning: *cognitive presence*, or the extent to which students can cultivate a deep understanding of course material through communication and interaction with others; *social presence*, or the degree to which students can "project their personal characteristics into the community, thereby presenting themselves to the other participants as 'real people'" (Garrison et al., 1999, p. 89); and *teaching presence*, or the degree to which instructors effectively design the educational experience and work together with students to facilitate cognitive and social presence.

The CoI framework's differentiation between cognitive and social presence highlights the potential contributions of both course content-related and socially oriented online interactions to productive online learning experiences. Thus, we adopt the CoI framework because it is a useful theoretical lens for understanding how phatic expressions may influence the quality of online peer interactions. Moreover, in online courses, cognitive presence is positively related to

perceived learning and course performance (Lee et al., 2021; Sadaf et al., 2021); social presence has been linked to retention (Liu et al., 2009), satisfaction (Park & Kim, 2020), and performance (Joksimović et al., 2015); and teaching presence has been shown to predict perceived learning and satisfaction (Lim & Richardson, 2021). Altogether, existing research supports the notion that each of the three presences plays an important role in fostering meaningful online learning experiences.

2.2 Online peer help-giving in a community of inquiry

Past research has shown that among the various behaviors related to learning within a community of inquiry, online peer help-giving may be especially important to understand, given its direct implications for all three presences in the CoI framework (Jeng, Williams-Dobosz, et al., 2023). Specifically, online peer help-giving interactions present opportunities for students to contribute collaboratively to the three presences. We approach this research with the understanding that, in the online context, peer responses to requests for help could potentially be viewed as "helpful" in multiple ways; i.e., through contributions to cognitive, social, or teaching presence.

First, peer help-giving can contribute to cognitive presence by allowing both the help-seeker and help-giver to construct meaning about course content collaboratively through interaction (Jeng, Williams-Dobosz, et al., 2023). Specifically, in a helping interaction, the help-seeker can achieve an academic goal that they would otherwise be unable to achieve on their own, and the help-giver can solidify their own understanding of the relevant topic (Webb & Mastergeorge, 2003). Thus, such interactions may be beneficial for learning because they allow for deeper understanding of course content.

Second, help-giving can promote social presence by creating opportunities for students to develop supportive online networks that contribute to a sense of connectedness and belonging (Brouwer et al., 2022; Jeng, Bosch, et al., 2023b). Additionally, within help-giving interactions, students can further contribute to social presence by providing socio-emotional support in the form of words of encouragement (Jeng, Williams-Dobosz, et al., 2023). Generally speaking, when students feel well-supported in online learning environments, they can build a strong sense of community with others (Rovai, 2002). Hence, help-giving interactions may also be beneficial for online students because they foster social presence through a connected online learning community.

Lastly, insights into the conditions underlying effective online help-giving behaviors may have direct implications for teaching presence because research has shown that instructors and students play important roles in facilitating supportive peer interactions in online settings (McInnerney & Roberts, 2004). For example, instructors may wish to encourage peer help-giving by modeling help-giving for their students or teaching them how to give help to others effectively. More generally, help-giving interactions can support teaching presence by bringing attention to difficulties faced by multiple students enrolled in an online course (Jeng, Williams-Dobosz, et al., 2023), thus prompting instructors and other students to address these issues.

Despite the importance of help-giving for learning in online settings, research has shown that not all types of help-giving are equally effective for learning (Oortwijn et al., 2008). In a review of literature on students' online learning experiences, Caskurlu et al. (2021) found that although online interactions are often useful for learning, these interactions also vary widely in their perceived effectiveness. In this regard, research has shown that in the context of online learning, helpful feedback to student work tends to be specific, detailed, and encouraging

(Bigatel et al., 2012; Leibold & Schwarz, 2015). These characteristics associated with effective feedback may also be helpful in the context of peer help-giving. Nevertheless, the unique context of peer help-giving remains relatively unexplored: whereas feedback typically involves evaluating students' work or performance (Hattie & Timperley, 2007), help-giving involves responding to requests for assistance from students facing academic difficulties (Webb, 1989). In other words, insights into help-giving will uniquely equip educators to extend support to students who encounter questions and difficulties during the learning process, compared to other important online learning opportunities. Therefore, it is important that researchers investigate the conditions under which help-giving interactions are perceived as supportive within an online community of inquiry.

2.3 Phatic expressions in help-giving interactions

Scholars have previously suggested that online peer interactions may be most helpful for learning when students remain focused on course content during discussions. For instance, Guzdial and Turns (2000) defined effective asynchronous online course discussions as those that remain centered on class topics, emphasizing that "the most direct indicator that students may be learning about class topics is that they are talking about class topics" (p. 441). Similarly, Gao et al. (2009) proposed that online asynchronous discussions are most productive when their participants interact to understand and critique course material. These findings align with previous research indicating that personal feedback (e.g., praise given to a student that is unrelated to their academic work) can inhibit learning by distracting attention away from academic content (Hattie & Timperley, 2007). Thus, it may be important for students to remain focused on relevant course content when giving help to their peers in online settings.

However, “off topic” messages, which do not directly relate to course content, may also contribute to desired learning outcomes by providing valuable socio-emotional support in online settings. Online students frequently experience a greater sense of isolation than their in-person counterparts (Gillett-Swan, 2017), and, in this regard, asynchronous course discussion forums can be useful tools for connecting students and building a sense of belonging to one’s course community (Thomas et al., 2014). At the same time, students who communicate via such forums often struggle to convey and interpret emotional cues (Gao et al., 2013). Thus, help-giving interactions that effectively provide socio-emotional support, in addition to academic assistance, may have heightened importance in the online context. This unique feature of the online learning environment, along with the fact that informal communication looks different in in-person vs. online settings (Beins, 2016), highlights the importance of studying social dimensions of online help-giving.

In particular, recent studies have shown that phatic expressions—comments that are social rather than informative in nature (e.g., greetings, compliments, apologies, and other forms of “small talk”)—may play important roles in building rapport, trust, connectedness, and motivation in online learning environments (Al-Dheleai et al., 2020; Wuryaningrum, 2023). For example, Jeng, Bosch, et al. (2023b) observed that informal online comments, such as words of encouragement, can serve a socially supportive function that may be especially helpful for students experiencing a low sense of belonging to their course community. That is, phatic expressions may be helpful because they play an important role in directly fostering social presence within an online community of inquiry.

Nevertheless, it remains unclear how helpful students find phatic expressions in online peer help-giving interactions. Although previous work (e.g., Jeng, Williams-Dobosz, et al., 2023)

has begun to examine online peer help-giving behavior, to our knowledge, no study has identified the extent to which phatic expressions contribute to or detract from the perceived helpfulness of a help-giving reply, independent of the course-related information provided. Furthermore, although researchers have identified different types of phatic expressions used in both in-person and online communication (Laver, 1975; Maíz-Arévalo, 2017), the relative helpfulness of these types of phatic comments in online learning-oriented interactions remains unexplored.

3 The present study

In the present exploratory study, we examine the impact of four types of phatic expressions on the perceived helpfulness of help-giving replies in an asynchronous online course discussion forum. These types include: greeting/parting tokens, which open or close messages (e.g., "Hi there"); self-oriented comments, which refer to the speaker (e.g., "I've had a busy week"); other-oriented comments, which refer to the addressee (e.g., "Thanks for your question"); and neutral comments, which are comments on the "context shared by the interlocutors" (Maíz-Arévalo, 2017, p. 440) (e.g., "Nice weather today"). This typology is based on empirical observations of phatic expressions used by students while communicating online (Maíz-Arévalo, 2017) and aligns with prior conceptualizations of phatic communication in in-person settings (Laver, 1975).

We focus on how students perceive the helpfulness of different replies because it is critical that students see the help they receive from their peers as beneficial for their learning. The perceived helpfulness and quality of online discussions have been shown to be related to students' academic achievement (Lee, 2013) and sense of belonging to their course community (Jeng, Bosch, et al., 2023b). Given that these learning outcomes are directly related to cognitive

and social presence, respectively, students may demonstrate improved learning outcomes relevant to the CoI framework when they perceive their online peer interactions as helpful. Additionally, students may need to trust the help they receive from their peers before implementing that help in their own work, making the perceived helpfulness of a help-giving reply a precursor to that help actually being used.

Mixed methods can provide a more complete and contextualized picture of students' help-giving interactions, compared to either qualitative or quantitative approaches alone. Thus, there is a need for research that uses both quantitative and qualitative methods to arrive at a rich understanding of how phatic expressions are perceived in the context of online peer help-giving interactions.

Our overarching research question (RQ) is as follows*: How do phatic expressions influence the perceived helpfulness of online peer help-giving replies posted to a college course discussion forum?* This overarching RQ can be broken down into the following quantitative, qualitative, and mixed method RQs that guide each stage of the research process:

- **Quantitative RQ:** *How do students rate the helpfulness of online peer help-giving replies that do and do not include phatic expressions?*
- **Qualitative RQ:** *What do students describe as helpful or unhelpful about phatic expressions in online peer help-giving replies posted to a college course discussion forum?*
- **Mixed method RQ:** *How do the qualitative findings about students' perceptions of phatic expressions converge with, diverge from, or complement the quantitative findings about students' helpfulness ratings?*

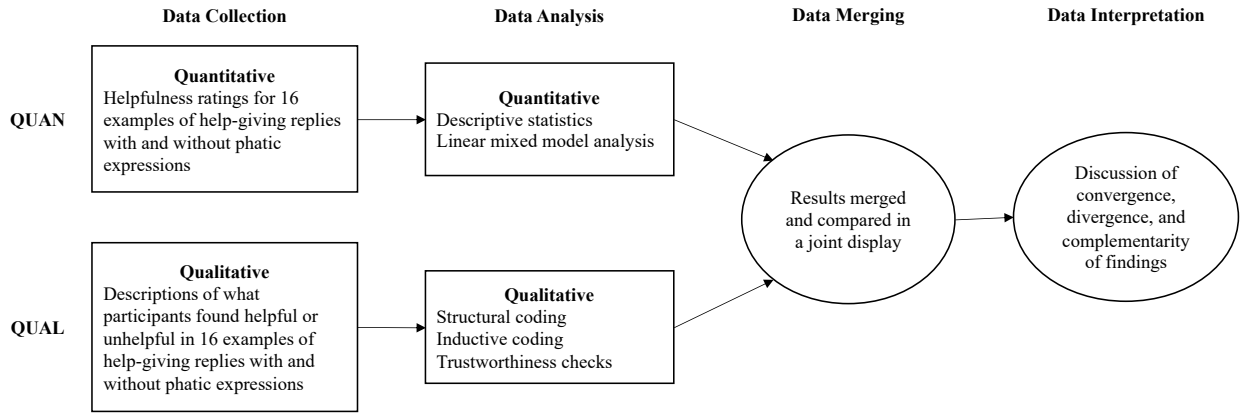
4 Method

4.1 Research design

The present study employed a convergent parallel mixed methods design, which involves the concurrent collection of quantitative and qualitative data within the same timeframe (Creswell & Plano Clark, 2017). We administered a survey that collected both quantitative and qualitative data on how participants judged the helpfulness of examples of online peer help-giving replies with and without the four types of phatic expressions. First, participants rated the helpfulness of examples of replies to requests for help posted to a college course discussion forum, thus providing data for the quantitative strand of the study. Second, participants explained in their own words what they found helpful or unhelpful in those same example replies, thus providing data for the qualitative strand of the study. We analyzed quantitative and qualitative data separately and subsequently integrated the findings to develop a more comprehensive understanding of our research topic. Figure 1 provides an overview of our research design.

Figure 1

Convergent Parallel Mixed Methods Design



4.2 Legitimation

To ensure the legitimacy of our findings, we adhered to guidelines for the legitimation of mixed methods research outlined by Onwuegbuzie and Johnson (2006). First, we maximized *weakness minimization legitimation* by capitalizing on the respective strengths of our quantitative and qualitative methods. Specifically, while our study's quantitative strand allowed us to identify general patterns regarding the relationship between phatic expression use and the perceived helpfulness of online peer help-giving replies, our qualitative strand provided a deeper understanding of what participants found helpful and unhelpful about the different types of phatic expressions. By employing a convergent parallel design, we were also able to obtain both quantitative and qualitative data from all participants, thus allowing us to use participants' own written perspectives to illuminate their helpfulness ratings, and vice versa.

Second, we maximized *multiple validities legitimation* by ensuring that both our quantitative and qualitative strands individually met established standards of validity, reliability, and trustworthiness relevant to the methods used. These procedures are described in detail in "Analysis," below.

4.3 Participants and procedure

We recruited student participants from a public university in the Midwestern United States during the Spring 2022 semester. Participants were enrolled in a large introductory statistics course that was offered both in-person and online, and completed the study in exchange for extra credit. The research protocol was approved by the university's Institutional Review Board, and we obtained informed consent from all participants.

During the survey, participants viewed and assessed the helpfulness of 16 examples of online peer help-giving interactions. Each help-giving interaction involved two forum posts: an initial post from a student requesting academic help (e.g., "I got 7.75 as my z score, but I'm

unsure what p value it would have, since it's off the chart."), and a help-giving reply from a different student in the same course. We selected examples that varied in the type of help sought and the nature of help given, so that a diversity of help-giving interactions would be represented in our study materials.

For each of the 16 example help-giving interactions, participants were randomly shown one of two possible versions of the same reply: a *non-phatic version* of the reply that only discussed course content (e.g., "For any z-score that is huge, to the point where it's off the chart, you can assume the p-value is going to be pretty much 0") or an edited *phatic version* of the reply that discussed the same course content and also included one of the four types of phatic expressions (e.g., "This is a very good question. Basically, for any z-score that is huge and off the chart, you can assume the p-value is pretty much 0").

Existing research on online user reviews has shown that, across many features encompassing structure, lexicon, and syntax, post length ranks as one the most important predictors of a post's perceived helpfulness (Kim et al., 2006). Thus, we designed the two versions (phatic and non-phatic) of each example help-giving reply to be equal in length, to avert the possibility that participants would view longer replies to be more helpful. Of our 16 help-giving replies, 5 included a greeting/parting token in the phatic version of the reply, 4 included a self-oriented comment, 4 included an other-oriented comment, and 3 included a neutral comment. We based our design on existing research where greeting/parting tokens and neutral comments were found to be the most and least frequently used types of phatic expressions, respectively, in online settings (Maíz-Arévalo, 2017). Thus, we included the most examples with greeting/parting tokens and the least examples with neutral comments to ensure the authenticity

of our study materials and reflect the real-world prevalence of these phatic expressions in online contexts.

To create both versions of the 16 example help-giving replies, we selected and adapted actual course discussion forum posts written by students in past semesters of the statistics course from which we recruited our participants. We selected our example help-giving replies to reflect the range of help-giving messages and phatic expressions found in a semester of forum messages. Additionally, the order in which the 16 replies were presented was randomized for each participant. Both versions of the example help-giving exchanges used in this study can be found in the Appendix.

For each example help-giving exchange, participants a) rated the helpfulness of the reply on a rating scale from 1 = *Not helpful* to 5 = *Very helpful,* via the prompt "How helpful is this response?"; and b) explained the reasoning behind their rating in an open-ended text response, via the prompt "Please use the space below to explain why you selected the level of helpfulness you did." Participants' helpfulness ratings and open-ended responses formed the units of analyses for the quantitative and qualitative strands of our study, respectively. Participants also provided information on their race/ethnicity (possible choices: "Asian or Asian American," "Black or African American," "Hispanic or Latino," "White," "other," "prefer not to say"), gender (possible choices: "man," "woman," "non-binary," "other," "prefer not to say"), first-generation college student (FGCS) status (determined based on the highest level of education achieved by each parent/guardian, where we defined a first-generation college student as a student who did not have at least one parent or guardian with a bachelor's degree), and course version (possible choices: "in-person," "online," "prefer not to say").

Originally, 345 participants completed the survey. We excluded 6 participants who demonstrated response bias by providing the same helpfulness rating for all 16 replies, as well as an additional 19 participants who demonstrated a lack of authentic engagement with the study materials by providing identical responses for >50% of their open-ended responses. For quantitative analyses, we also excluded an additional 11 participants who were missing data on at least one background variable (i.e., race/ethnicity, gender, FGCS status, or course version). Our final sample consisted of the remaining participants (n = 309 for quantitative analyses, n = 320 for qualitative analyses). The data, variables, materials, and analysis scripts that supported this research are available online (Jeng, Bosch, et al., 2023a). Table 1 contains a demographic breakdown of our sample.

Table 1

Participant Demographic Breakdown

	n	**%**
Race/ethnicity		
Asian or Asian American	74	23.13%
Black or African American	45	14.06%
Hispanic or Latino	44	13.75%
White	138	43.13%
Other	12	3.75%
Prefer not to say	7	2.19%
Gender		
Man	81	25.31%
Woman	232	72.50%
Non-binary	7	2.19%
FGCS status		
Continuing-generation	207	64.69%
First-generation	106	33.13%
Prefer not to say	7	2.19%
Course version		
Online	166	51.88%
In-person	154	48.13%
Total	320	

4.4 Analysis

4.4.1 Quantitative strand

Statistical analyses were implemented using R version 4.2.2 (R Core Team, 2020). To address our quantitative RQ, we performed a linear mixed model analysis of the data with maximum likelihood estimation. We accounted for two potential sources of clustering in the data that violated regression's assumption of independent observations (Cnaan et al., 1997). First, each participant provided helpfulness ratings for 16 different help-giving replies, and we could not consider multiple ratings from the same participant to be independent of one another. Second, our 16 help-giving examples varied greatly in their content and average helpfulness ratings, so we also expected variation in participants' ratings to be clustered by help-giving example (which we label as "post ID" in the remained of this report).

We constructed a linear mixed model (Model A) with random intercepts to address our quantitative RQ. We included helpfulness rating as the dependent variable, participant ID and post ID as random effects, and phatic expression type (i.e., the type of phatic expression associated with the version of each reply shown to each participant), FGCS status, race/ethnicity, gender, and course version as fixed effects. Thus, mixed effects modeling allowed us to explore the fixed effect of phatic expression type on helpfulness rating, while accounting for clustering in the data attributable to participant ID and post ID.

We coded phatic expression type into four variables ("greeting/parting token," "self-oriented comment," "other-oriented comment," and "neutral comment") at the individual rating level, with "no phatic expression" as the baseline for comparison. We coded FGCS status, gender, and course version as binary variables at the participant level, with "continuing-generation," "man," and "in-person" as the baseline groups for comparison, respectively. We coded race/ethnicity into four variables ("Asian or Asian American," "Black or African

American," "Hispanic or Latino," and "other race") at the participant level, with "White" as the baseline for comparison.

We also constructed and tested additional models with interaction terms to examine whether the associations between phatic expression type and helpfulness rating were moderated by race/ethnicity (Model B), gender (Model C), FGCS status (Model D), or course version (Model E).

4.4.2 Qualitative strand

To address our qualitative RQ, we examined what participants described as helpful or unhelpful about the four types of phatic expressions investigated in this study. Our qualitative analyses proceeded along three stages: 1) structural coding, 2) inductive coding, and 3) trustworthiness checks.

4.4.2.1 Structural coding

During structural coding, we reduced our full set of participants' open-ended responses to those relevant to our RQ of interest (MacQueen et al., 1998). We sought to limit our qualitative data set to the open-ended responses where participants mentioned the helpfulness of a phatic expression.

To this end, we first reduced our full data set of 5,120 participant responses to the 2,559 responses written in response to example help-giving replies with a phatic expression. Then, two members of the research team deductively coded 300 of these responses for whether the participant mentioned the relevant phatic expression in their response. Each participant response was assigned a value of "1" if the phatic expression was mentioned (e.g., "Gives them the formula and an apology," "The ending is unnecessary") and "0" if it was not (e.g., "Not enough explanation," "Clear, concise answer"). The coders obtained excellent reliability (Cohen's κ =

.94; see Landis & Koch [1977]), and each coder independently coded approximately 50% of the remaining responses for mentions of a phatic expression.

Structural coding was an iterative process: throughout subsequent stages of qualitative analysis, we continually reassessed the relevance of different participant responses to our RQ of interest and at times made changes to which responses were included in our final qualitative data set. Ultimately, a total of 374 participant responses were identified as mentioning the helpfulness of the relevant phatic expression.

4.4.2.2 Inductive coding

We used a general inductive approach to qualitative analysis—which "allow[s] research findings to emerge from the frequent, dominant, or significant themes inherent in raw data" (Thomas, 2006, p. 239)—to examine what participants described as helpful or unhelpful about each of the four types of phatic expressions. We adopted a general inductive approach because it provides a systematic and flexible procedure for summarizing large amounts of qualitative data.

First, we performed a line-by-line coding of participants' open-ended responses to develop codes that addressed our qualitative RQ. Each code was a short phrase or word that summarized what a participant's open-ended response identified as helpful or unhelpful about a phatic expression. Second, we grouped similar codes into categories that identified patterns in what participants found helpful and unhelpful about the different types of phatic expressions. Two coders independently coded and categorized all 374 open-ended responses that were identified as mentioning a phatic expression. The coders met to discuss differences in their obtained categories and ultimately agreed on a final set of four categories that addressed our qualitative RQ.

Table 2 provides examples of how we moved from codes to categories during analysis.

Table 2

Inductive Coding Examples

Participant response	Code(s)	Category
"Says the answer and gives some encouraging words"	Encouraging	Kindness
"Very kind of them to be so supporting"	Kind, supportive	Kindness
"No need to say sorry"	Don't say sorry	Unnecessary comment
"Just take out the extra part, not necessary"	Unnecessary part	Unnecessary comment
"By writing the first sentence, it's possible the it could have stressed the student out more than necessary"	Stress-inducing	Discouraging
"Last part is quite demotivating to read"	Demotivating	Discouraging
"Love how they referred to another student"	Refers to student	Connectedness
"I think this … shows the person who responded is also listening to others."	Listens to others	Connectedness

4.4.2.3 Trustworthiness checks

We assessed the trustworthiness of our inductive coding procedure in two ways. First, to evaluate the stability of our obtained categories, two coders deductively applied each category to the 374 participant responses that mentioned a phatic expression. Each response was assigned a value of "1" if the relevant category was mentioned and "0" if it was not. The two coders obtained excellent agreement for all categories (Cohen's κ ranged from .88 to .97), and all differences were discussed and reconciled.

Second, we considered the possibility that our obtained categories were not exclusive to the examples with phatic expressions; i.e., it is possible that participants also mentioned the same categories when evaluating help-giving replies without phatic expressions. Thus, two coders also independently applied each category to the 2,561 participant responses that were written in response to example help-giving replies with no phatic expression (each coder coded approximately 50% of the responses). We found that just 56 responses mentioned at least one of

the four categories when referencing examples without phatic expressions. For these reasons, we considered our categories to be trustworthy reflections of what participants described as helpful or unhelpful about phatic expressions in their open-ended responses.

4.4.3 Integration

During integration, we merged our quantitative and qualitative findings to gain insight on our research phenomena beyond what could be achieved from analyzing the data associated with each strand independently. First, we integrated our data by creating a joint display matrix that allowed for side-by-side comparisons of our quantitative and qualitative results (Younas et al., 2020). We placed the primary findings associated with our quantitative strand in the joint display's first column, categories and illustrative participant quotes from our qualitative strand in the joint display's second column, and meta-inferences that discuss our quantitative and qualitative findings together in the joint display's third column. We present our joint display matrix in the Results section of this paper, when discussing our integrated findings. Second, we narratively integrated our data by describing and interpreting them together in the Results and Discussion sections of this paper (McCrudden & McTigue, 2019).

5 Results

5.1 Quantitative strand

5.1.1 Descriptive statistics

Participants generally found help-giving examples to be moderately helpful (M = 3.57, SD = 1.36). Help-giving examples with other-oriented phatic comments had a mean helpfulness rating of 3.78 (SD = 1.21), as did examples with greeting/parting tokens (M = 3.78, SD = 1.29). Examples with no phatic expression had a mean helpfulness rating of 3.61 (SD = 1.35). Examples with neutral comments had a mean helpfulness rating of 3.36

(*SD* = 1.38), and those with self-oriented comments had a mean helpfulness rating of 3.09 (*SD* = 1.47).

The mean helpfulness ratings, along with their respective standard deviations, for both the phatic and non-phatic versions of each example reply, can be found in the Appendix.

5.1.2 Linear mixed model analysis

Model A had an intraclass correlation coefficient (ICC) of .34; that is, approximately 34% of the variance in helpfulness rating was attributable to random effects. As a global test of Model A, we performed a likelihood ratio test (LRT) to examine whether our fixed effects explained a significant amount of variance in helpfulness rating, after accounting for the random effects of participant ID and post ID. We found that Model A provided better fit for the data than a null model that included helpfulness rating as the dependent variable, participant ID and post ID as random effects, and no fixed effects ($\chi^2[11] = 30.33$, $p = .001$).

We present estimates and effect sizes associated with Model A in Table 3. On average, participants perceived help-giving replies with neutral ($p = .003$, $\eta_p^2 = .002$) and self-oriented ($p < .001$, $\eta_p^2 = .004$) comments to be significantly less helpful than replies discussing course content alone, with small effect sizes (Cohen, 1988). In contrast, participants perceived replies with greetings/parting tokens ($p = .48$) and other-oriented comments ($p = .76$) to be equally helpful to replies discussing course content alone. Race/ethnicity (ps > .05), gender ($p = .56$), FGCS status ($p = .28$), and course version ($p = .96$) did not significantly predict helpfulness rating.

Next, we performed LRTs on Models B through E to examine whether the associations between phatic expression type and helpfulness rating were moderated by race/ethnicity (Model B), gender (Model C), FGCS status (Model D), or course version (Model E). In the cases of

Models B ($\chi^2[16] = 22.23$, $p = .14$), C ($\chi^2[4] = 3.24$, $p = .52$), D ($\chi^2[4] = 3.76$, $p = .44$), and E ($\chi^2[4] = 2.76$, $p = .60$), the inclusion of these interaction terms led to non-significant increases in the amount of explained variance in helpfulness rating. In other words, the association between phatic expression type and helpfulness rating did not depend on these background variables.

Table 3

Fixed Effects Estimates from Linear Mixed Model Analysis

Fixed effect	*B*[a]	*SE B*	*t*	*B* 95% *CI*	β[b]	η_p^2
(Constant)	3.67	0.18	20.09***	[3.29, 4.05]	0.07	.95
Phatic expression type						
Greeting/parting token	0.04	0.06	0.71	[-0.07, 0.15]	0.03	<.001
Other-oriented comment	-0.02	0.06	-0.30	[-0.14, 0.11]	-0.01	<.001
Self-oriented comment	-0.27	0.06	-4.25***	[-0.39, -0.15]	-0.20	.004
Neutral comment	-0.22	0.07	-3.01***	[-0.36, -0.08]	-0.16	.002
Race/ethnicity						
Asian or Asian American	0.02	0.07	0.31	[-0.12, 0.17]	0.02	<.001
Black or African American	0.02	0.09	0.21	[-0.15, 0.19]	0.01	<.001
Hispanic or Latino	-0.05	0.09	-0.58	[-0.24, 0.13]	-0.04	.001
Other	0.02	0.15	0.14	[-0.27, 0.31]	0.02	<.001
Gender						
Woman/non-binary	-0.04	0.06	-0.58	[-0.16, 0.09]	-0.03	.001
FGCS status						
First-generation	-0.07	0.06	-1.09	[-0.20, 0.06]	-0.05	.004
Course version						
Online	0.003	0.06	0.05	[-0.11, 0.12]	0.002	<.001

Note. Dependent variable is helpfulness rating (HR).

[a] *B* is the unstandardized effect estimate.

[b] Partially standardized effect estimates—the SD difference in HR between categories—are reported for all predictors.

*$p < .05$, ***$p < .001$.

5.2 Qualitative strand

We identified four categories of codes that collectively captured what participants described as helpful or unhelpful about the four types of phatic expressions: *kindness, discouragement, unnecessary comment,* and *connectedness.* In the following sections, we

describe each category and provide examples of participant responses associated with each category.

5.2.1 Kindness

Participants described kindness as a positive feature of phatic expressions by pointing out that help-giving replies with phatic expressions could be "respectful," "friendly," "validating," "nice," or a source of "reassurance." For example, in response to an example reply that included "Hang in there!" as a parting token, one participant wrote, "The student was to the point and answered the question while encouraging," and another noted that they "like the words of encouragement."

Additionally, we found that beyond being solely a source of encouragement for individual help-seekers, phatic expressions could also positively contribute to the overall atmosphere of one's online learning environment. In response to an example reply where the help-giver included an other-oriented comment by thanking the help-seeker for previously assisting them with coursework ("btw, thanks for responding to my post yesterday"), one participant wrote, "Not only did they help with the question, they also thanked for a previous help[ing interaction], creating a healthy environment that allows everyone to feel involved and appreciated."

However, participants did not always agree on which phatic expressions were considered kind. For example, in response to the aforementioned reply that included "Hang in there," one participant expressed a different viewpoint, writing, "'Hang in there' … could possibly be taken as condescending by some students who are struggling (depends on the person)."

In total, 210 participant open-ended responses were coded as describing kindness as a positive feature in the phatic version of an example reply. Of these responses, 92 were written in

response to an example with a greeting/parting token, 67 in response to an example with a self-oriented comment, 38 in response to an example with an other-oriented comment, and 13 in response to an example with a neutral comment.

5.2.2 Discouragement

Participants stated that in some cases, the inclusion of phatic expressions could be discouraging to the help-seeker in question. Participants noted that such expressions could be perceived as "condescending," "demotivating," or "passive aggressive." For example, in the phatic version of one example reply, the help-giver makes the neutral comment, "Wow, that test is coming quickly!" Participants noted that this information could be "stress inducing" or "anxiety inducing." Similarly, in the phatic version of a different example reply, the help-giver makes a neutral comment about the length of a reading for the course ("The textbook chapter on this topic was long!"). Multiple participants reacted negatively to this comment, writing that the reply is "not very helpful and seems a little [bit] condescending" and noting that the phatic comment "doesn't help with the answer, nor does it make a positive environment for the discussion."

However, similarly to our findings concerning kindness, participants did not always agree on which phatic expressions were considered discouraging. For instance, in response to the aforementioned example reply commenting on the length of a reading for the course, one participant found the reply "relatable," another referred to it as "nice and friendly," and yet another participant stated that it does a good job "empathizing with the student."

In total, 19 participant open-ended responses were coded as describing discouragement as a negative feature in the phatic version of an example help-giving reply. Of these responses, 16 were written in response to an example with a neutral comment, 2 in response to an example

with a greeting/parting token, 1 in response to an example with a self-oriented comment (in response to a reply where the help-giver states that they "also find probability questions to be quite tricky," a participant wrote, "the first sentence … makes the topic seem hard for a student to do and [is] demotivating"), and none in response to an example with an other-oriented comment.

5.2.3 Unnecessary comment

We found that participants described phatic expressions as unnecessary when they did not perceive such expressions as directly addressing the help-seeker's course-related misunderstanding or problem. Participants noted phatic expressions could be "not helpful," "unrelated to the question," and "out of place." For instance, across a variety of help-giving examples, participants wrote responses such as "Just take out the extra part, not necessary," "No need for the first sentence," and "It was helpful but I don't think the side comment was necessary."

In total, 121 participant open-ended responses were coded as describing an unnecessary comment as a negative feature in the phatic version of an example help-giving reply. Of these responses, 47 were written in response to an example with a self-oriented comment, 45 in response to an example with a neutral comment, 16 in response to an example with an other-oriented comment, and 13 in response to an example with a greeting/parting token.

5.2.4 Connectedness

Participants described phatic expressions as promoting connectedness when help-giving replies built bonds between students or gave credit to others for their work. For instance, in response to an example reply with an other-oriented comment where the help-giver referred to a different student's post ("I thought one of our classmates had a great post about this from a

different thread"), one participant wrote, "I think this really helped the classmate and it shows the person who responded is also listening to others." In response to the same example, a different participant wrote, "The person made sure to give credit where credit was due." Moreover, participants noted that an other-oriented comment that thanks the help-seeker can build a sense of connectedness by creating positive interactions beyond those related to course content; e.g., one participant wrote, "I like how they interacted with the person … at the end," and another wrote, "This answers the question and attempts to create a connection with classmates!"

Notably, apart from one participant response that described an example reply with a neutral comment as building "good conversation" between students, other-oriented comments were the only type of phatic expression coded as promoting connectedness between students. Out of 33 participant open-ended responses coded as mentioning connectedness, 32 were written in response to an example with an other-oriented comment.

5.3 Integration

Our integrated data shed light on what participants found helpful or unhelpful about each of the four types of phatic expressions, as well as how these perceptions of helpfulness translated to helpfulness ratings in the present study.

Our quantitative findings showed that example help-giving replies with greeting/parting tokens and other-oriented comments were rated as equally helpful to those discussing course content alone. Our qualitative findings extended these results by demonstrating that these types of replies were more likely than other types were to be described as motivating, friendly, and conducive to building connections between students. Although some participants viewed greeting/parting tokens and other-oriented comments as unnecessary (e.g., one participant wrote,

"I don't think you need to put 'Hope you're doing well'"), overall these expressions were characterized as welcome sources of encouragement and acknowledgement. Thus, our integrated data showed that students may be able to include greeting/parting tokens and other-oriented comments in their online help-giving messages without detracting from the overall perceived helpfulness of their posts because such expressions are perceived as kind and/or connecting by the addressee.

Additionally, our quantitative findings showed that example help-giving replies with self-oriented and neutral comments were perceived as significantly less helpful than those discussing course content alone. Our qualitative findings extended these results by demonstrating that these types of replies were more likely than other types were to be described as unnecessary and discouraging. Although some participants noted that self-oriented and neutral comments could also be friendly and relatable (e.g., in response to an example reply where the help-giver wrote that they were similarly stuck on the help-seeker's problem, one participant wrote that "sympathy … helps the student feel like they are not alone in their need for help"), participants' descriptions of these comments often characterized them as unneeded. Thus, our integrated data showed that self-oriented and neutral comments may be more frequently perceived as detracting from the overall perceived helpfulness of a help-giving reply because such expressions often serve little purpose and potentially distract from the help given.

Table 4 displays our joint display matrix summarizing our quantitative findings, qualitative findings, and meta-inferences.

Table 4

Joint Display of Results

Type of phatic expression	Quantitative findings	Qualitative findings	Meta-inferences
Greeting/parting token	Help-giving replies with greeting/parting tokens were rated as equally helpful to those discussing course content alone.	Examples with greeting/parting tokens were the most frequently described as kind (e.g., "[The reply] says the answer, and gives some encouraging words").	Greeting/parting tokens did not detract from the overall perceived helpfulness of students' help-giving messages because they were seen as encouraging, supportive, and friendly.
Other-oriented comment	Help-giving replies with other-oriented comments were rated as equally helpful to those discussing course content alone.	Examples with other-oriented comments were the most frequently described as building connections between students (e.g., "I liked how they referenced the words of another student to help guide them through everything").	Other-oriented comments did not detract from the overall perceived helpfulness of students' help-giving messages because they were seen as contributing to connections between students.
Self-oriented comment	Help-giving replies with self-oriented comments were rated as significantly less helpful than those discussing course content alone.	Examples with self-oriented comments were among the most frequently described as unnecessary (e.g., "I understand apologizing about the late response but in this case, mentioning that your week is busy is irrelevant").	Self-oriented comments detracted from the overall perceived helpfulness of students' help-giving messages because they were seen as unnecessary in the context of help-giving.
Neutral comment	Help-giving replies with neutral comments were rated as significantly less helpful than those discussing course content alone.	Examples with neutral comments were the most frequently described as unnecessary or discouraging (e.g., "This was helpful but the 'lots of posts on the forum today' was not necessary to include," "Beginning is condescending").	Neutral comments detracted from the overall perceived helpfulness of students' help-giving messages because they were seen as unnecessary and possibly discouraging.

6 Discussion

In the present exploratory investigation, we observed that the inclusion of phatic expressions in online peer help-giving replies overall did not lead to improved helpfulness ratings. Our qualitative findings highlight a potential reason for this result: although several participants pointed out that certain phatic expressions could be kind or connecting, none of them

described phatic expressions as directly contributing to students' comprehension of course material. Thus, it is possible that participants generally did not see phatic expressions as adding to the helpfulness of a response because such expressions do not directly address the help-seeker's academic struggle.

These findings have implications for our understanding of what students perceive to be helpful in the context of online peer help-giving interactions. Specifically, our results indicate that among the three presences outlined in the CoI framework, cognitive presence—or the degree to which students develop a deep understanding of course material through their interactions with others—appeared to have the greatest influence on how students assessed the helpfulness of a peer help-giving reply. Thus, consistent with previous scholarship on learning-oriented online discussions (e.g., Gao et al., 2009), we propose that academic help-giving interactions should first and foremost aim to foster cognitive presence through engagement with course concepts.

Nevertheless, previous work has proposed that online instructors should also encourage social, informal communication between students as a way to build community, as long as these interactions do not obstruct learning (Beins, 2016). In this regard, our study makes a valuable contribution to the literature by demonstrating that students can include greeting/parting tokens and other-oriented comments in their online help-giving message without detracting from the overall perceived helpfulness of their post, possibly because these comments are perceived as kind and/or contributing to connections between students.

When we view these findings through the lens of the CoI framework, it appears that although these types of phatic expressions may not directly promote cognitive presence, they may promote social presence and teaching presence by acknowledging the addressee's presence and thus contributing to a positive and connected learning community. For example, research has

demonstrated that encouraging interactions between students contribute substantially to online social presence (Sung & Mayer, 2012), and our qualitative findings highlight how phatic expressions can foster an encouraging learning environment through words of kindness. Moreover, in online learning contexts, students can contribute to teaching presence by building connections that facilitate the development of the other two presences in a community of learners (Garrison et al., 1999). In this regard, our qualitative findings on connectedness highlight how other-oriented phatic expressions, specifically, can foster teaching presence by building bonds between peers that create opportunities for further interaction and learning.

In sum, although our participants did not find replies with phatic expressions to be more helpful than those without phatic expressions (possibly because such expressions do not contribute to cognitive presence), they nevertheless described ways in which phatic expressions can still be valuable for learning through contributions to social presence and teaching presence in a community of inquiry. Pending additional work on how the use of phatic expressions influences students' learning outcomes, our findings may have important implications for practice. For example, instructors and college students may wish to build a practice of incorporating greetings, farewells, and other-oriented comments into their online help-giving messages to foster social presence and teaching presence among their students.

In contrast, we found that help-giving replies with self-oriented and neutral comments were, on average, rated as less helpful than replies discussing course content alone. Notably, these two types of phatic expressions were more likely than other replies were to be described by participants as unnecessary, possibly because self-oriented and neutral comments do not as frequently or effectively serve a community-building function. In fact, some participants mentioned that neutral comments can be discouraging, especially when students bring up aspects

of the course that may be a source of stress for others (e.g., a reading, test). Thus, we recommend that students exercise caution when incorporating self-oriented or neutral comments in their help-giving messages, as these comments may be perceived as: a) discouraging, and thus obstructing the development of social presence; and/or b) unnecessary, and thus distracting from the help given and obstructing the development of cognitive presence.

Lastly, we overall found no significant differences in how participants perceived the helpfulness of phatic expressions based on demographic characteristics. However, further research is needed to understand how students with diverse characteristics and sociocultural backgrounds perceive the use of phatic expressions in peer help-giving interactions. For example, previous research has suggested that individuals in certain cultural contexts may prioritize direct communication over politeness when interacting with peers (Gudykunst et al., 1996); consequently, individuals with certain cultural perspectives may be more likely to view phatic expressions as unnecessary, because such expressions may not serve an explicit informational purpose in the context of help-giving. Additionally, student characteristics such as personality traits (Vaughan-Johnston & Jacobson, 2020) and learning motivation (Gan, 2020) have been recently shown to be related to students' preferences for academic feedback. Therefore, future research should explore how diverse student characteristics influence perceptions of phatic expressions in academic help-giving interactions.

7 Limitations

This study faces multiple limitations that highlight promising avenues for future work. First, our focus on helpfulness may have limited our ability to capture what phatic expressions contribute to online peer interactions. For example, although phatic expressions may not add to the perceived helpfulness of a reply, it is possible that participants still found replies with phatic

expressions to be satisfactory for other reasons; for instance, because phatic comments act as a source of comfort or motivation. Thus, researchers may wish to conduct future studies to prompt participants to evaluate online peer interactions using alternative metrics of quality (e.g., "How satisfactory is this response?"). Additionally, our focus on students' perceptions prevented us from investigating whether different help-giving replies genuinely contributed to students' understanding of course material. For this reason, future work could also assess actual learning outcomes associated with receiving different types of help-giving replies.

Moreover, in this study, participants evaluated the helpfulness of hypothetical help-giving exchanges, and it is possible that their perceptions of phatic expressions may differ when they are in the position of needing academic help themselves. Future research in this area could encourage participants to reflect on and evaluate real instances where they have requested online academic support and received replies from fellow students, thus providing a more authentic context for assessing the role of phatic expressions in help-giving.

Furthermore, although our analyses assessed the helpfulness of phatic expressions independent of the course-related information provided in a help-giving reply, it is possible that our participants' evaluations of phatic expressions were influenced by our example replies' non-phatic components. For example, if a participant already viewed the course-related component of a help-giving reply as unhelpful (e.g., because it is incorrect or under-explained), then they may have been especially inclined to view the inclusion of a phatic expression as unnecessary (e.g., because they feel the help-giver should have prioritized improving the course-related component of the reply).

Lastly, we adjusted the wording of the non-phatic components in our various examples to ensure equal response lengths between the two versions of each example. It is possible this

choice influenced our results by altering the meaning of a reply's non-phatic component between its non-phatic vs. phatic versions or affecting the external validity of our materials (e.g., by making the phatic versions of our examples shorter than they normally would be). Thus, future research should examine more closely how the perceived helpfulness of phatic expressions can be influenced by other components of a help-giving reply.

8 Conclusion

This study explored how phatic expressions influence the perceived helpfulness of online peer help-giving interactions in asynchronous course discussion forums. Our findings revealed that certain types of phatic expressions, such as greeting/parting tokens and other-oriented comments, did not detract from the perceived helpfulness of a reply and may contribute to social presence and teaching presence. In contrast, self-oriented and neutral comments were perceived as unnecessary and potentially distracting from the help given. It is recommended that students incorporate greetings, farewells, and other-oriented comments to foster social presence, while exercising caution with self-oriented and neutral comments. Ultimately, insight into the role of phatic expressions in help-giving could help instructors foster productive and meaningful online learning experiences.

CRediT authorship contribution statement

Amos Jeng: Conceptualization, Methodology, Formal analysis, Investigation, Writing – Original draft preparation, Writing – Review & Editing. **Nigel Bosch:** Conceptualization, Methodology, Writing – Review & Editing. **Michelle Perry:** Conceptualization, Methodology, Writing – Review & Editing, Supervision.

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Appendix

Example Help-Giving Exchanges

Request for help	Non-phatic version		Phatic version		
	Reply	**Mean rating**	**Reply***	**Phatic expression type**	**Mean rating**
Hi, I really don't understand how we're supposed to find the median from a histogram.	From the histogram, you can create a chart and then find where 50% falls. In the example we used in class earlier this week, 50% occurred at the 40 hour mark. In other words, 50% of people worked less than 40 hours and 50% worked more than 40 hours.	4.04 (*SD* = 1.01)	Hi there! From the histogram, you can create a chart and then find where 50% falls. In the example from class, 50% occurred at the 40 hour mark. In other words, 50% of people worked less than 40 hours and 50% worked more than 40 hours. Hope this helps! :)	Greeting/parting token	4.17 (*SD* = 1.02)
Why am I getting this wrong? I thought that if the p-value is more than a certain value, we can reject the null. This is so frustrating.	Remember the rule: if the p-value is more than 5, you don't reject the null.	3.67 (*SD* = 1.21)	Hi, if the p-value is more than 5, don't reject the null. Hang in there!!	Greeting/parting token	3.27 (*SD* = 1.36)
If evaluators are not aware of who was in the treatment group and who was in the control group, wouldn't this be considered an observational study rather than a designed experiment (since the researcher didn't decide who got the treatment)?	An observational study is when the subjects themselves or simply fate determines who gets the treatment and who doesn't. This isn't the case when we're talking about experiments. Also, if the evaluators knew which participants were in the treatment vs. control group, it could cause them to be biased when analyzing results. The fact that they don't know who's in which group makes the experiment double-blind.	4.44 (*SD* = 0.93)	Hello! An observational study is when the subjects themselves or simply fate determines who gets the treatment. This isn't the case in an experiment. Also, if the evaluators knew who was in the treatment vs. control group, it could bias them when analyzing results. The fact that they don't know who's in which group makes the experiment double-blind. Hope that helps - see you in class!	Greeting/parting token	4.49 (*SD* = 0.84)

Request for help	Non-phatic version		Phatic version		
	Reply	**Mean rating**	**Reply***	**Phatic expression type**	**Mean rating**
How do you find degrees of freedom for a t-test?	The degrees of freedom is the same as n. It is important because it will affect the shape of your t-distribution when performing a t-test.	3.01 (*SD* = 1.36)	Good afternoon! :-) The degrees of freedom is the same as n, and it will affect the shape of your t-distribution when performing a t-test	Greeting/parting token	3.14 (*SD* = 1.38)
How do you find the average of the residuals of a regression line?	In general, for linear regression, the average of the residuals will always be equal to 0.	3.54 (*SD* = 1.35)	Hey, hope you're doing well! In linear regression, the average of the residuals is always 0.	Greeting/parting token	3.79 (*SD* = 1.25)
I got 7.75 as my z score, but I'm unsure what p value it would have, since it's off the chart.	For any z-score that is huge, to the point where it's off the chart, you can assume the p-value is going to be pretty much 0.	3.39 (*SD* = 1.27)	This is a very good question. Basically, for any z-score that is huge and off the chart, you can assume the p-value is pretty much 0.	Other-oriented comment	3.52 (*SD* = 1.32)
Can someone explain what I have to do to find the regression line equation?	The principle behind it is that you essentially need to find the equation (y=mx+b) of the regression line. First, to get the slope(m), you can multiply the r you're given by (SD of y)/(SD of x). Second, to get the y-intercept(b),you can plug m, x, and y into y=mx+b. Since you already have the values of one (x,y) pair from the previous problem, you can use those to solve for b, and then you have the whole equation.	4.71 (*SD* = 0.59)	I thought one of our classmates had a great post about this from a different thread, so I've copied it here: "you need to find the equation (y=mx+b) of the regression line. To get the slope(m), multiply the r you're given by (SD of y)/(SD of x). To get the y-intercept(b), plug m, x, and y into y=mx+b. You can use the values of the (x,y) pair from the previous problem to do this and solve for b."	Other-oriented comment	4.47 (*SD* = 0.78)
Are confounders only applicable to observational studies? And must casual links have immediate factors that explain a control and a treatment?	Confounders are not limited, in terms of their applicability, to observational studies. In other words, they can be present in any experiment.	3.31 (*SD* = 1.14)	Thanks for your question! It's a good one. Confounders aren't limited to observational studies - they can be present in any experiment.	Other-oriented comment	3.08 (*SD* = 1.16)

Request for help	Non-phatic version		Phatic version		
	Reply	**Mean rating**	**Reply***	**Phatic expression type**	**Mean rating**
For question b on the HW, how do you find Q1 and Q3 on the boxplot?	So for this HW question, Q1 would be the bottom of the rectangle on the boxplot, as it represents the 25th percentile, and Q3 would be the top of the rectangle on the boxplot, as it represents the 75th percentile.	3.78 (*SD* = 1.17)	Q1 is the bottom of the rectangle, as it represents the 25th percentile, and Q3 is the top of the rectangle, as it represents the 75th percentile. (btw, thanks for responding to my post yesterday - it was very helpful)	Other-oriented comment	4.06 (*SD* = 1.03)
How do you calculate the z statistic for a two-sample z test?	For a two-sample z test, the z statistic can be calculated using the following formula: z= (observed - expected)/SE.	4.29 (*SD* = 0.96)	You'd use the formula z= (observed - expected)/SE. Sorry for the delay in responding; I've had a busy week.	Self-oriented comment	3.74 (*SD* = 1.12)
How do you solve 1c: "Draw one student at random, what is the chance that the student is either a girl or blonde?"	The textbook is a good resource to consult for this question. It does a great job of explaining how to solve this kind of problem on p.94.	2.68 (*SD* = 1.25)	Agh, I also find probability questions to be quite tricky. The textbook does a great job of explaining how to solve this kind of problem on p.94.	Self-oriented comment	2.44 (*SD* = 1.23)
I'm not sure what to look for on the chi-squared table when finding the p-value. This is really unclear to me.	First, you need to find the row on the chi-squared table that corresponds to your degrees of freedom (using the first column). Then, you need to follow the numbers in that row across until you land on the number closest to your chi-square statistic. That will be your p-value.	4.26 (*SD* = 0.91)	It's okay, I was also stuck on this for a while! First, you need to find the table row that corresponds to your degrees of freedom (using the first column). Then, follow the numbers in that row across until you land on the number closest to your chi-square statistic.	Self-oriented comment	4.28 (*SD* = 1.01)
I'm confused on how you would find the average value of a draw for this question. I've tried doing what was recommended and I still can't seem to figure it out…	The professor talked specifically about this type of question in class earlier this week; the lecture videos for Monday should have the information needed to solve the problem.	2.03 (*SD* = 1.07)	Oh man I'm also incredibly confused about this haha... I know the professor discussed this type of question in class, though, so I would check Monday's lecture videos!	Self-oriented comment	1.88 (*SD* = 1.07)

Request for help	Non-phatic version		Phatic version		
	Reply	**Mean rating**	**Reply***	**Phatic expression type**	**Mean rating**
I was studying for next week's test and it looks like I've forgotten how to find outliers. How do I find them on a box plot?	Each line found in the boxplot represents a percentile, in 25% increments. Think about it like this: 25% of the data lies between the minimum and Q1, between Q1 and the median, between the median and Q3, and lastly between Q4 and the maximum.	3.06 (*SD* = 1.51)	Wow, that test is coming quickly! Anywho, each line in the boxplot represents a percentile, in 25% increments: 25% of the data lies between the minimum and Q1, between Q1 and the median, between the median and Q3, and between Q4 and the maximum.	Neutral comment	3.23 (*SD* = 1.48)
How do we do D? I've tried so many times and I can't get it right	Use the formula SD+ = SD * sqrt(n / (n - 1)). You'll see that the SD is given in the problem, and n is the sample size	4.44 (*SD* = 0.94)	Lots of posts on the forum today! SD+ = SD * sqrt(n / (n - 1)). SD is given in the problem, and n is the sample size	Neutral comment	3.86 (*SD* = 1.18)
Are there any helpful tricks to remember controlled experiment verses observational?	So controlled experiment means that the researchers involved are controlling stuff. On the other hand, observational means the researchers are just observing the outcome.	3.29 (*SD* = 1.36)	Controlled experiment means that researchers are controlling stuff, and observational means they're just observing the outcome. The textbook chapter on this topic was long!	Neutral comment	2.99 (*SD* = 1.32)

*The phatic expression is underlined in the phatic version of the reply.

Biography

Amos Jeng is an Educational Psychology doctoral student at UIUC. He investigates how diverse students develop supportive connections in higher education settings.

Nigel Bosch is an Assistant Professor of Information Sciences and Educational Psychology at UIUC. His work concerns machine learning, algorithmic fairness, and human-centered computing, particularly in educational contexts.

Michelle Perry is a Professor of Educational Psychology at UIUC. Her work explores social, cultural, and discursive contexts that support learning of STEM concepts.