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Computer-Mediated Cross-Cultural Collaboration: Attributing Communication Errors to the Person Versus the Situation

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Computer-mediated communication, such as e-mail, facilitates cross-cultural interactions by enabling convenient communication. During these exchanges, the absence of contextual or situational information may cause e-mail recipients to form dispositional explanations for behavior that might in fact be driven by unseen situational constraints. To gain insight into the manner in which e-mail recipients explain behavior, the authors conducted an experiment examining how technical language violations (i.e., spelling and grammatical errors) and deviations from etiquette norms (i.e., short messages lacking a conversational tone) affect a recipient's perceptions of an e-mail sender's conscientiousness, intelligence, agreeableness, extraversion, affective trustworthiness, and cognitive trustworthiness. This study also investigated whether the effects of technical and etiquette language violations depend on the availability of information indicating the e-mail sender is from a foreign culture. Results reveal that participants formed negative perceptions of the sender of an e-mail containing technical language violations. However, most of these negative perceptions were reduced when participants had situational information indicating that the e-mail sender was from a different culture. Conversely, negative attributions stemming from etiquette violations were not significantly mitigated by knowledge that the e-mail sender was from a foreign culture.

Keywords: computer-mediated communication, fundamental attribution error, virtual teams, distributed work, cross-cultural communication

Computer-mediated communication (CMC) is an extensive part of today's workplace, in which companies commonly utilize CMC technologies (e.g., e-mail, video conferencing) to connect employees and customers worldwide. In many cases, human relationships develop for lengthy periods of time with no face-to-face contact. Therefore, impressions are formed devoid of the information normally imparted during face-to-face exchanges. As CMC is replacing interactions that previously occurred in person or by telephone (Watt, Lea, & Spears, 2002), there is a need to understand problems that can arise when people rely on virtual communication media. Once communication problems and pitfalls are identified, targeted solutions can be developed to alleviate them. Only then can the benefits of CMC be fully realized.

The present study addresses the need for research in this domain. In particular, this study examines whether the absence of contextual information (i.e., a "foreign" communication partner's cultural background) increases e-mail recipients' tendency to attribute e-mail errors and irregularities to the message sender's disposition. This issue is especially important in today's global economy, in which cross-cultural computer-mediated interactions are increasingly commonplace.

Benefits of Cue Deprivation

One form of CMC, e-mail, is considered a relatively lean avenue of communication because it does not allow the transmission of visual/nonverbal cues (Jünemann & Lloyd, 2003). By restricting communications to text, e-mail has the potential to filter out or reduce the salience of cues that can lead to discrimination (Amichai-Hamburger, 2008). Research in many areas of psychology has demonstrated that nonverbal and visual cues influence our first impressions of others. Physically attractive people are commonly favored because they are viewed more positively (e.g., as more intelligent and likable) than their less attractive counterparts (Cann, Siegfried, & Pearce, 1981; Feingold, 1992; Gilmore, Beehr, & Love, 1986; Marlowe, Schneider, & Nelson, 1996). Crocker, Cornwell, and Major (1993) suggested that overweight people are often negatively stereotyped, and Hart and Morry (1997) found that a person's race influences the trait inferences made about that person. Disability is also an issue, causing researchers to suggest that text-based CMC, such as e-mail, could benefit people with disabilities because it decreases the visibility of behaviors that trigger discrimination; someone reading an e-mail would not necessarily know the sender has a disability (Watt et al., 2002). In the employment domain, Anderson (2003) has suggested that technologies which filter out visual cues may help reduce adverse impact from interviews because interviewers do not know the ethnic identity of the applicant. In a similar vein, Straus, Miles, and Levesque (2001) found that less physically attractive applicants

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were rated more favorably after a telephone interview than after a face-to-face (FTF) interview.

In short, CMC technologies that allow individuals to communicate without seeing each other may enable people to work on a more equal status level, in which potentially irrelevant physical attributes such as age, weight, race, attractiveness, and disability are not incorporated into people's judgments of each other. As noted by Amichai-Hamburger (2008),

> Every FTF meeting has in-built biases due to interpersonal physical features which lead to labeling, stereotyping, and other distorted perceptions. . . . The fact that the Internet does not expose people to the physical traits of the other side is likely to create an opposite effect, in which people are much more likely to rely on personality characteristics when evaluating another person. (p. 553)

Drawbacks to Cue Deprivation: The Fundamental Attribution Error

On the other hand, there may also be significant drawbacks when a person is forced to make judgments with a reduced amount of information, such as when a collaborator's physical characteristics are hidden during communication. For some purposes, personal characteristics (e.g., disability, age, culture) suggested by visual cues are anything but irrelevant but instead carry valuable information. Such information can be used to help people understand a collaborator's context and constraints, interpret communications relayed by the collaborator, and explain miscommunications and errors when they transpire.

This is a nontrivial issue, given the heightened propensity for miscommunication during CMC (Cramton, 2001). As collaborators rely on CMC, errors are known to occur due to the intricacies of the interaction (Cramton & Webber, 2005). When communication problems arise, people look for a cause or a reason to explain the source of the problem. Social psychology commonly places these explanations into two broad categories: those that are situational and those that are dispositional in nature. That is, the recipient of an e-mail message may attribute a miscommunication to situational factors, such as technology problems and/or other external constraints impinging on the sender. Alternatively, he or she may attribute a miscommunication to dispositional variables, such as the sender's carelessness, poor attitude, or personality. Attribution theory posits that people favor dispositional over situational explanations; this phenomenon is typically called the "fundamental attribution error" but is also known as the "correspondence bias" or "overattribution effect" (Gilbert, Pelham, & Krull, 1988; Tetlock, 1985). This bias occurs when people fail to take into account the situational variables influencing a person's behavior and attribute behavior instead to a person's disposition (Heider, 1944; Jones & Nisbett, 1972).

CMC creates a context in which the fundamental attribution error is particularly likely to arise (Cramton, 2001), in part because there is less situational information and immediate feedback in CMC than in FTF communication (Becker-Beck, Wintermantel, & Borg, 2005). Gilbert et al.'s (1988) elaboration of the fundamental attribution error helps explain the mechanism through which CMC may encourage dispositional attributions, even when unwarranted. According to Gilbert et al., forming explanations of others' behavior normally involves three steps, two that entail automatic processes (requiring little conscious attention) followed by a third step that is a more deliberate or controlled process (requiring significant mental resources). These steps are as follows: (a) categorization (e.g., automatically identifying an e-mail miscommunication); (b) characterization (e.g., automatically drawing dispositional inferences about the e-mail sender); and (c) correction (e.g., expending mental effort to adjust those inferences with information about the sender's situational constraints; Gilbert et al., 1988). The absence of information about situational constraints makes it difficult if not impossible for people to complete the third step. It follows, then, that filtering out visual and auditory cues that signal a communication partner's context and constraints can encourage the fundamental attribution error during CMC by preventing e-mail recipients from adjusting the dispositional inferences they automatically form after receiving a message from a collaborator. When contextual information is not on hand, people will have only dispositional explanations available with which to understand their collaborators' behaviors.

To examine the fundamental attribution error's existence online, Cramton (2001) investigated the attributions formed by geographically distributed project teams. Results indicated that CMC team members did not communicate much information about the context of the situation within which they were working. This decreased the situational variables available for explaining dispersed communication partners' behavior. Even when contextual variables (e.g., vacations, deadlines) were communicated to other team members, that information was not often remembered (Cramton, 2001). Results of Cramton's study indicate that when teams are primarily using CMC, individuals may fail to account for the situational variables influencing another's behavior and rely instead on dispositional explanations.

Proposed Effects of Culture Cues on Attributions

A person's culture is an important contextual (i.e., situational) variable that may influence that person's behavior. Although culture can be considered at many different levels, for our purpose in this study the idea of national-level culture is what is referenced (Hofstede, 1991). A person's culture defines certain norms and rules for behavior as well as that person's language of preference. As such, technical language violations (e.g., spelling and grammar errors) and phraseology that deviates from expected norms are two problems that can occur during text-based CMC exchanged by people from two different cultures. Although these problems could be attributed to a sender's disposition, they could also be the result of the sender communicating in a second language or applying etiquette norms that are based on a culture that differs from the e-mail recipient's culture.

Culture is often conveyed to other people through visual and auditory cues, such as distinct physical features or an accent when speaking. As noted, such cues are not typically available in text-based CMC. Therefore, it is possible that an e-mail recipient will not know that his or her communication partner identifies with a culture different from his or her own. An e-mail recipient may thus rely on dispositional attributions about a sender's behavior even in instances in which situational variables (i.e., culture) would provide more appropriate explanations.

When people read an e-mail with technical language violations, the attributions they make can influence their overall opinion of the sender. Indeed, research supports the assertion that writing

style, such as choice of words and spelling errors, influences the impressions we form of others (Lea & Spears, 1992). Spelling errors have been found to affect people's perceptions of the writer (Kreiner, Schnakenberg, Green, Costello, & McClin, 2002). Similarly, people who send grammatically correct e-mail messages are viewed more positively than those whose messages are not considered grammatical (Jessmer & Anderson, 2001). In particular, higher competency ratings are given to people whose e-mail messages are grammatical. Additionally, recipients are more likely to want to work with senders of grammatical messages (Jessmer & Anderson, 2001).

In CMC, typographical errors may be attributed to carelessness or a person being in a hurry (Lea & Spears, 1992). Jessmer and Anderson (2001) found that when compared to people who read an e-mail with no grammatical errors, people who read e-mails with grammatical errors believed the e-mail sender spent significantly less time editing the message. Consequently, conscientiousness is one particular attribution that technical language violations may influence. Conscientious individuals are careful and thorough (McCrae & Costa, 1987). If e-mail recipients do not have situational information indicating a collaborator is from a different culture, they will likely attribute spelling and grammar errors to dispositional traits such as lack of conscientiousness. However, if recipients realize their collaborator is from a different culture, they may be more likely to take that situational information into account and excuse the errors when making judgments about the collaborator. That is, they are likely to make allowances for the person due to situational constraints (i.e., writing in a second language) imposed by cross-cultural collaboration. As such, recipients should not be as inclined to attribute technical language errors to a sender's lack of conscientiousness when the sender is known to be "foreign" or "nonnative."

> *Hypothesis 1:* There will be an interaction between cultural cues and technical language violations such that information revealing an e-mail sender's nonnative identity will reduce the negative effects of technical language violations on a recipient's perceptions of the sender's conscientiousness.

Conscientiousness may not be the only dispositional variable influenced by technical language violations. In an experiment conducted by Kreiner et al. (2002), a significant, negative relationship was found between spelling errors in an essay and a person's perception of the essay writer's intellectual ability. The relationship between spelling and grammar errors and intellectual ability is also reflected in the results of a study by Alexander (1985), which found that older children perceived vocabulary and grammar skills as a part of intelligence. We expected that the relationship between errors in language use and perceived intelligence would extend to e-mail communications devoid of cues indicating that the exchange is cross-cultural. However, for the reasons described above, the relationship between grammatical errors and perceived intelligence should weaken when e-mail recipients are aware of a collaboration partner's nonnative status—a situational constraint that potentially offers an alternative explanation for grammatical errors.

> *Hypothesis 2:* There will be an interaction between cultural cues and technical language violations such that information revealing an e-mail sender's nonnative identity will reduce the negative effects of technical language violations on a recipient's perceptions of the sender's intelligence.

Another outcome that may be influenced by e-mail errors is trust. Trust entails confidence in another's behavior. When people are not interacting FTF, there are fewer social cues for them to use when making judgments about interpersonal trust (Wilson, Straus, & McEvily, 2006). Due to the lack of social information in text-based CMC, a person has to make a judgment of interpersonal trust exclusively based on what and how something is shared in writing.

The trust construct can be parsed into different dimensions (J. K. Butler, 1991). One conceptualization empirically supported by McAllister (1995) suggests there is an affective and a cognitive component to trust. Whereas affective trust encompasses interpersonal care and concern, the cognitive component of trust captures a rational decision, based on experience, about factors such as another person's reliability, responsibility, and competence. It should be noted that cognitive trustworthiness is not the same thing as conscientiousness, even though conscientious individuals may indeed be viewed as cognitively trustworthy. Conscientiousness reflects a global aspect of personality. Conversely, cognitive trustworthiness is a job-specific construct that explicitly reflects the professionalism, dedication, and competence with which people perform their work.

It is likely that technical language errors on the part of an e-mail sender can influence a recipient's judgment of the sender's competence. Considering the important linkage between competence and cognitive trustworthiness, these errors may in turn adversely affect how much the recipient trusts the sender. This effect is believed to be strongest in the absence of cues providing situational/contextual explanations for technical language errors. As operating cross-culturally is a situational constraint that presumably excuses technical language violations to a certain degree, the following interaction was expected.

> *Hypothesis 3:* There will be an interaction between cultural cues and technical language violations such that information revealing an e-mail sender's nonnative identity will reduce the negative effects of technical language violations on a recipient's cognitive perceptions of the sender's trustworthiness.

Technical language violations are not the only area of concern during cross-cultural exchanges. Etiquette may also be an issue. People from different cultures can vary in their e-mail etiquette rules and norms (Carmel, 1999). The business world has taken notice of these issues and is providing training to help head off challenges stemming from cross-cultural e-mail etiquette violations.

Although there are an extensive number of variations of how e-mail etiquette could differ between cultures, for our purpose in this study, etiquette deviation is operationalized as a difference in the expected length and conversational style of e-mails. Courses are offered to Chinese small business owners on social etiquette for working with Western companies. One of the topics addressed in these classes is e-mail etiquette (Fong, 2004). According to Fong, one problem business owners have is sending

e-mails lacking the niceties expected by many Westerners. Unfortunately, an e-mail conveying only necessary information and lacking a conversational tone may be interpreted as rude or curt. Professional advice on e-mail writing often suggests being concise yet also courteous and polite (e.g., Kizzire, 2007; Stanley, 2008). Americans tend to view overly concise e-mail messages as rude (Carmel, 1999). This can create problems for interpersonal relationships. According to a survey conducted by Collett (2004), tactlessness is one of the top seven errors in e-mail etiquette that bother business managers. Other research has shown that e-mail messages that are considered impolite affect people's assumptions about the e-mail sender's friendliness and likability (Jessmer & Anderson, 2001). In short, the tone of an e-mail can affect the recipient's perceptions of the e-mail sender.

McCrae and Costa (1987) suggested that people low in agreeableness may tend to behave rudely. Therefore, it is expected that someone reading an e-mail that is unusually short and lacking in conversational tone will rate the e-mail sender low on agreeableness unless he or she realizes that there are cross-cultural explanations for this etiquette deviation.

> *Hypothesis 4:* There will be an interaction between cultural cues and etiquette deviations such that information indicating an e-mail sender's nonnative identity will reduce the negative effects of etiquette deviations on a recipient's perceptions of the sender's agreeableness.

The extraversion factor of personality refers in part to a person's sociability (McCrae & Costa, 1987). If a person receives an unusually short e-mail message that lacks a conversational tone, he or she may presume the sender to be relatively unsociable and therefore low in extraversion. Again, this dispositional explanation for a message that violates conversational e-mail norms is particularly likely in the absence of information indicating the sender's status as an international collaborator.

> *Hypothesis 5:* There will be an interaction between cultural cues and etiquette deviations such that information indicating an e-mail sender's nonnative identity will reduce the negative effects of etiquette deviations on a recipient's perceptions of the sender's level of extraversion.

Finally, a person who sends an uncommonly terse e-mail may be perceived as lacking competent interpersonal skills necessary for work. Interpersonal skills are critical in most areas of work (T. Butler & Waldroop, 2004), so other employees may consider poor interpersonal skills a serious problem. As stated earlier, the cognitive component of trust captures a rational decision, based on experience, about factors such as another person's reliability, responsibility, and competence. If people believe that a collaborator lacks critical skills necessary for work (i.e., interpersonal skills), they will likely question that collaborator's competence to successfully perform a job.

Additionally, there is an affective component to trust that relies on demonstration of interpersonal care and concern (McAllister, 1995). In the presence of an e-mail viewed as terse, perceptions of affective trust may suffer. People tend to trust others who they like more than they trust those they do not enjoy (Parasuraman & Miller, 2004). According to Ayios (2003), interpersonal competence is a determinant of trust. Thus,

> *Hypotheses 6 and 7:* There will be an interaction between cultural cues and etiquette deviations such that information indicating an e-mail sender's nonnative identity will reduce the negative effects of etiquette deviations on a recipient's cognitive perceptions (*Hypothesis 6*) and affective perceptions (*Hypothesis 7*) of the sender's trustworthiness.

Method

Participants

Participants were students (N = 435; 56% women) from a university in the southeastern United States. The age of participants ranged from 17 to 29 years (M = 18.88 years, SD = 1.43). Of participants, 82% were Caucasian, 7% were African American, 4% were Asian, 2% were Hispanic, 1% were American Indian; 4% identified themselves as belonging to another ethnic group. Only individuals born in the United States whose first language was English were included in this study.

Design

This experiment employed a fully crossed 2 (cultural cue) × 3 (e-mail linguistic deviations) design. The first independent variable, cultural cue, had two levels: known (explicit indication that the e-mail author is from a foreign culture) and unknown (the exclusion of the e-mail author's culture). The second independent variable, e-mail linguistic deviations, consisted of three levels: control (e-mail was without technical language violations and used etiquette typical of a person from the United States); etiquette deviations (e-mail was relatively terse and lacked a conversational tone); and technical language violations (e-mail contained spelling and grammatical errors). Due to the high percentage of immigrants from Asian nations in management and professional positions (Larsen, 2003), the technical language violations condition was operationalized with errors said to be typical of people from an Asian culture (i.e., incorrect prepositions, homophones, lack of noun–verb agreement).

Participants were randomly assigned to one of the six conditions. Final sample sizes, shown in Table 1, fluctuated slightly across conditions after unusable cases (e.g., nonnative English speakers) were dropped.

Procedure

Participants used a university identification name and password to access a hyperlink to the experimental website. They read a scenario that asked them to imagine they were about to begin working on a project with an unknown person from a different division of their organization. Half of the scenarios revealed nothing about the collaborator's linguistic or cultural background. The remaining scenarios indicated that the unknown collaborator was a nonnative English speaker from outside the United States.

An e-mail from the collaborator was then shown. The e-mail was intended to represent the first piece of correspondence the collaborator sent to his or her communication partner. As such, it

Table 1
Sample Sizes and Mean Scores Per Condition

	No cultural cues						Cultural cues					
	No errors/ deviations (n = 74)		Technical errors (n = 75)		Etiquette deviations (n = 72)		No errors/ deviations (n = 74)		Technical errors (n = 74)		Etiquette deviations (n = 66)	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Perceived technical errors	3.31	0.69	2.21	1.14	3.24	0.66	3.50	0.63	2.22	0.97	3.35	0.70
Perceived etiquette deviations	3.77	0.74	3.39	0.63	3.03	0.91	3.89	0.58	3.73	0.64	3.11	0.93
Perceptions of sender's nonnative culture	2.26	1.03	2.12	1.10	2.29	1.14	1.29	0.98	0.61	0.93	1.18	1.07
Perceived conscientiousness	3.86	0.57	3.54	0.60	3.73	0.61	3.87	0.67	3.83	0.56	3.74	0.59
Perceived intelligence	3.49	0.49	3.06	0.83	3.39	0.58	3.52	0.49	3.49	0.66	3.45	0.52
Perceived agreeableness	3.80	0.59	3.69	0.52	3.53	0.41	3.74	0.55	3.86	0.50	3.45	0.62
Perceived extraversion	3.46	0.50	3.31	0.46	3.02	0.55	3.38	0.53	3.35	0.47	3.84	0.57
Perceived cognitive trust	3.85	0.66	3.36	0.83	3.70	0.66	3.94	0.64	3.72	0.73	3.81	0.58
Perceived affective trust	3.46	0.71	3.45	0.72	3.10	0.74	3.51	0.64	3.36	0.69	3.06	0.77

Note. For perceived technical errors and perceived etiquette deviations, lower values correspond to heightened perceptions of technical errors and etiquette deviations.

provided some brief introductory remarks indicating the sender's background experience, asking about communication preferences, and touching on a task-related matter. Participants were told that names and details had been omitted and replaced with brackets to protect the anonymity of all involved. To illustrate, the e-mail provided to participants assigned to the control condition (no technical language violations, no etiquette deviations) is provided in this article's Appendix.

For the technical language violation conditions, eight spelling and grammar errors were incorporated into the e-mail shown in the Appendix. Spelling errors were mistakes (e.g., homophones and inappropriate use of contractions) that would not be detected by an English spell checker. Grammatical errors included use of a singular word when a plural word was more appropriate, a comma splice, and use of an incorrect word ending (e.g., "wanting" instead of "wanted").

For the etiquette deviation condition, short or terse versions of the e-mail message shown in the Appendix were created. For the shortened version, care was taken to reduce the conversational tone yet still communicate the same factual information included in the longer e-mail. For the longer version (see Appendix), care was taken to ensure that any "filler" information was not substantive and/or addressed neutral topics, such as the weather. The goal was to create a conversational tone without providing or implying any particular information about the e-mail sender's personality. Pilot tests confirmed that the differences in these e-mails did not influence the actual meaning of the excerpts.

After reading the e-mail, participants completed online surveys measuring their perceptions of the target e-mail sender's personality (i.e., conscientiousness, extraversion, and agreeableness), intelligence, cognitive trustworthiness, and affective trustworthiness.

Measured Variables

Manipulation checks. Participants responded to three manipulation check items (α = .78) included to test the detection of information indicating that the e-mail sender came from a different culture. In addition, several Likert-type items, measured with a scale of 1 (*Strongly Disagree*) to a 5 (*Strongly Agree*), were included to ensure that errors (2 items, α = .89) or differences in phraseology (3 items, α = .70) were noticeable to participants who received them. Scores on items for the respective scales were averaged. Lower scores indicated the perception of a poorly written e-mail (e.g., presence of spelling mistakes, poor etiquette), whereas higher scores indicated the perception of a well-written e-mail (e.g., lack of errors, typical level of friendliness for situation).

Dependent variables. Table 2 summarizes the measures used to assess each dependent variable included in this study. Example items per scale are provided, along with Cronbach's alpha values indicating the reliability or internal consistency of scale items assessing the same factor. Responses to the items corresponding to each scale were averaged prior to analysis.

As indicated in Table 2, 30 items of the International Personality Item Pool (IPIP) (Goldberg, 1999) were modified to assess each participant's perception of the e-mail sender's conscientiousness (10 items, α = .87), extraversion (10 items, α = .83), and agreeableness (10 items, α = .83). The IPIP was chosen because previous research has demonstrated its validity when used in a Web-based format (Buchanan, Johnson, & Goldberg, 2005). In addition, five items (α = .86) were created for this study to assess each participant's perception of the e-mail sender's level of intelligence. Finally, five items modified from McAllister's (1995) measure of cognition-based trust (α = .85) and three items (α = .76) modified from McAllister's (1995) measure of affective-based trust were used to assess each participant's perception of the e-mail sender's trustworthiness. The original cognition-based trust scale included three items, but two of those original items reference more than one concept per item. For our purpose in this study, each of the double-barreled items was separated into two items. Also, the original 7-point response scale used by McAllister (1995) was changed to a 5-point scale to maintain consistency for this study.

Table 2
Summary of Scales Used to Assess Dependent Variables

Dependent variable	No. items	Example item	Response scale	α	Source
Perceived conscientiousness	10	"The e-mail sender shirks his/her duties."	1 (*Very Inaccurate*) to 5 (*Very Accurate*)	.87	Adapted from the IPIP (Goldberg, 1999).
Perceived intelligence	5	"The e-mail sender is probably a quick learner."	1 (*Strongly Disagree*) to 5 (*Strongly Agree*)	.86	Created for this study.
Perceived cognitive trustworthiness	5	"I could rely on this e-mail sender not to make my job more difficult by careless work."	1 (*Strongly Disagree*) to 5 (*Strongly Agree*)	.85	Adapted from McAllister (1995).
Perceived agreeableness	10	"The e-mail sender accepts people as they are."	1 (*Very Inaccurate*) to 5 (*Very Accurate*)	.83	Adapted from the IPIP (Goldberg, 1999).
Perceived extraversion	10	"The e-mail sender feels comfortable around people."	1 (*Very Inaccurate*) to 5 (*Very Accurate*)	.83	Adapted from the IPIP (Goldberg, 1999).
Perceived affective trustworthiness	3	"I could freely share my ideas, feelings, and hopes with this person."	1 (*Strongly Disagree*) to 5 (*Strongly Agree*)	.76	Adapted from McAllister (1995).

Note. IPIP = International Personality Item Pool. IPIP items adapted from "A Broad-Bandwidth, Public Domain, Personality Inventory Measuring the Lower-Level Facets of Several Five-Factor Models," by L. R. Goldberg, 1999. In the public domain.

Results

Preliminary Analyses

Table 1 shows the average scale scores, per condition, for each of the measured variables assessed in this study. Overall, there were no significant differences in the makeup of the conditions based on gender, $\chi^2(5, N = 434) = 6.53$, $p = .26$, age, $F(5, 421) = .68$, $p = .64$, $\eta_p^2 = .01$, and ethnicity, $\chi^2(25, N = 435) = 34.29$, $p = .10$. Table 3 presents the descriptive statistics and intercorrelations for perceptions of the sender's conscientiousness, intelligence, cognitive trustworthiness, agreeableness, and affective trustworthiness.

The data were examined to determine whether the experimental manipulations were noticed, as intended. Table 1 provides the manipulation check means per condition. Results clearly confirmed the effectiveness of each experimental manipulation. Those randomly assigned to receive information about the e-mail sender's nonnative culture ($M = 1.02$, $SD = 1.03$) were less likely than those who did not receive this information ($M = 2.22$, $SD = 1.09$) to endorse True/False items indicating the e-mail sender is a native English speaker from the United States, $t(425) = 11.65$, $p < .001$, $\eta_p^2 = .26$. In addition, results from analysis of variance (ANOVA), $F(2, 431) = 63.33$, $p < .001$, $\eta_p^2 = .30$, and follow-up post hoc tests employing a Bonferroni correction indicated that individuals who read an e-mail with technical language errors ($M = 2.22$, $SD = 1.05$) were significantly more likely to report spelling and grammatical errors than were their counterparts who either read e-mails with no errors/deviations whatsoever ($M = 3.42$, $SD = 0.68$) or read e-mails with etiquette errors only ($M = 3.29$, $SD = 0.67$).[1] For the etiquette deviation manipulation ANOVA results, $F(2, 432) = 20.44$, $p < .001$, $\eta_p^2 = .14$, and follow-up post hoc tests employing a Bonferroni correction indicated that individuals who read an e-mail with deviations in etiquette ($M = 3.07$, $SD = 0.92$) were significantly more likely to report e-mails that were different in tone and not as friendly as typical introductory e-mails as were participants who either read e-mails with no errors/deviations ($M = 3.82$, $SD = 0.67$) or read e-mails with technical language errors only ($M = 3.57$, $SD = 0.66$).

Hypothesis Tests

Hypotheses 1–3 proposed that there would be an interaction between cultural cues and technical language violations on a recipient's perceptions of the sender's conscientiousness (Hypothesis 1), intelligence (Hypothesis 2), and cognitive trustworthiness (Hypothesis 3). To test these hypotheses, we conducted a 2 × 2 multivariate analysis of variance (MANOVA) with 297 participants. Both levels of the cultural cue independent variable (present and not present) were included along with two levels of the e-mail linguistic deviation independent variable (none, technical language violations) and the three dependent variables of interest.

The overall MANOVA indicated significant multivariate main effects for both the presence of technical language violations and the presence of cultural cues, as well as a significant multivariate effect for the interaction between the presence of cultural cues and technical language violations on the dependent variables, as indicated by Wilks' criterion (see Table 4). These significant results were decomposed, and three ANOVAs for each dependent variable indicated main effects of both technical language violations and cultural cues for all three dependent variables of interest. Statistics for these analyses can be found in Table 4. Furthermore, significant interactions were found for perceived conscientiousness and intelligence. In support of Hypotheses 1 and 2, providing information revealing an e-mail sender's nonnative, foreign identity reduced the negative effects of technical language violations on a recipient's perceptions of the sender's conscientiousness (see Figure 1) and intelligence (see Figure 2). Hypothesis 3 was not supported.

Hypotheses 4–7 predicted there would be an interaction between cultural cues and etiquette deviations on perceptions of the sender's agreeableness (Hypothesis 4), extraversion (Hypothesis 5), cognitive trustworthiness (Hypothesis 6), and affective trustworthiness (Hypothesis 7). We conducted a 2 × 2 MANOVA and follow-up ANOVAs on 304 participants to test Hypotheses 4–7

[1] Lower values correspond to heightened perceptions of technical errors and etiquette deviations.

Table 3
Descriptive Statistics and Intercorrelations Between Study Variables

Measured variable	*M*	*SD*	1	2	3	4	5	6
1. Perceived conscientiousness	3.76	0.61	—					
2. Perceived intelligence	3.40	0.63	.53**	—				
3. Perceived cognitive trustworthiness	3.73	0.71	.66**	.72**	—			
4. Perceived agreeableness	3.68	0.55	.48**	.26**	.33**	—		
5. Perceived extraversion	3.23	0.56	.35**	.23**	.29**	.51**	—	
6. Perceived affective trustworthiness	3.33	0.73	.29**	.37**	.44**	.52**	.50**	—

Note. $N = 435$.
** $p < .01$ (two-tailed).

(see Table 5). Both levels of the cultural cue independent variable (present and not present) were included along with two levels of the e-mail etiquette deviation independent variable (none, etiquette deviation) and the four dependent variables of interest. The proposed hypotheses were not supported, as indicated by a nonsignificant interaction, $F(4, 297) = 0.16$, $p = .96$, $\eta_p^2 = .00$, between the presence of cultural cue and etiquette deviation on perceived agreeableness (Hypothesis 4), extraversion (Hypothesis 5), cognitive trustworthiness (Hypothesis 6), and affective trustworthiness (Hypothesis 7). However, as indicated in Table 5, there was a significant main effect of the presence of etiquette deviations on all four dependent variables.

Discussion

Today's workplace is relying on cross-cultural collaboration more than ever before (Fujimoto, Bahfen, Fermelise, & Härtel, 2007). Although there are a variety of options for cross-cultural communication (e.g., traveling, Skype, telephone), the benefits of e-mail (e.g., asynchronicity, convenience, low cost) suggest it will continue to be used for a long time to come, particularly during economic hardships when budgets to support travel and in-person meetings are likely to dwindle. Despite the prevalence and importance of cross-cultural CMC, there is a limited amount of research addressing this phenomenon (Archee, 2003). The present study examined how attributions are formed when e-mail is used as a primary means of communication and suggested how to reduce the likelihood of negative dispositional attributions stemming from e-mail errors that occur during cross-cultural CMC.

Past research has been conducted on the attributions that develop during CMC (e.g., Cramton, 2001; Jessmer & Anderson, 2001); however, this study is the first to examine how the addition of contextual information (i.e., a cultural cue) can mitigate the unfavorable dispositional attributions stemming from CMC errors. Results showed that grammar and spelling mistakes negatively affect perceptions of an e-mail sender's intelligence, conscientiousness, and cognitive trustworthiness, suggesting that in the absence of explicit situational information, people confronted with poorly constructed e-mail messages will attribute the errors to the sender's personal attributes. However, providing situational or contextual information in the form of cues indicating that a communication partner is from a foreign country reduces the tendency to attribute spelling and grammatical mistakes to an e-mail sender's conscientiousness and intelligence (but not trustworthiness).

Although technical language errors were largely forgivable when committed by foreign communication partners, etiquette violations were not similarly excused. This study revealed main effects indicating that etiquette errors negatively influence an e-mail recipient's perceptions of the e-mail sender's extraversion, agreeableness, and trustworthiness. The present study is the first to test and document these main effects. Contrary to our expectations, these effects were not mitigated by providing the participant with information about the e-mail sender's cultural background.

Table 4
MANOVA Examining the Interaction of Technical Language Violations and the Presence of Cultural Cues on Perceptions of an E-Mail Sender

	Multivariate results					Univariate results			
Independent variable	*F*	*df* (between, within)	*p*	η_p^2	Dependent variable	*F*	*df* (between, within)	*p*	η_p^2
Technical language violations	6.14	3, 291	<.001	.06	Perceived conscientiousness	6.40	1, 293	.01	.02
					Perceived intelligence	10.00	1, 293	<.001	.03
					Perceived cognitive trustworthiness	18.41	1, 293	<.001	.06
Presence of cultural cues	3.36	3, 291	.02	.03	Perceived conscientiousness	4.83	1, 193	.03	.02
					Perceived intelligence	9.55	1, 293	<.001	.03
					Perceived cognitive trustworthiness	7.13	1, 293	.01	.02
Technical Language Violations × Presence of Cultural Cues	2.99	3, 291	.03	.03	Perceived conscientiousness	3.96	1, 293	.05	.01
					Perceived intelligence	7.62	1, 293	.01	.03
					Perceived cognitive trustworthiness	2.56	1, 293	.11	.01

Note. $N = 297$. MANOVA = multivariate analysis of variance.

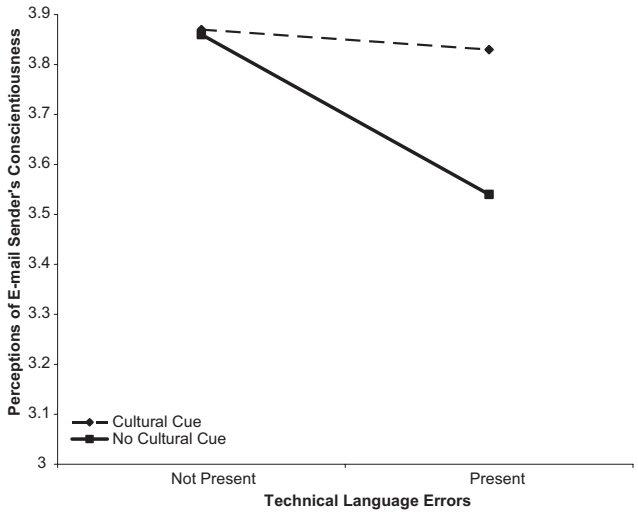

Figure 1. Interaction of technical language errors and cultural cues on perceptions of the e-mail sender's conscientiousness.

In short, the data suggest that people rely more on dispositional explanations for technical e-mail errors (i.e., spelling and grammar mistakes) when a cross-cultural constraint is invisible and more on situational explanations when it is salient. For etiquette errors, they rely on dispositional explanations regardless of the cross-cultural constraint's salience. When one considers these results, it is important to remember that the formation of dispositional attributions is not always an error. This is one argument in favor of using the term *correspondence bias* in lieu of *fundamental attribution error* to describe the tendency to draw dispositional inferences when interpreting others' behaviors. Clearly, an e-mail sender could both be a nonnative English speaker and be dispositionally careless. We do not mean to imply that dispositional explanations should always be replaced with situational explanations; this is simply not the case. However, we do mean to suggest that virtual teammates operating under challenging situational constraints, such as communicating in a second language, should be given the benefit of the doubt before one automatically decides that their communication errors signal deficits in important attributes such as intelligence and conscientiousness.

Theoretical Implications

In this carefully controlled experiment, we saw the same situation, a cross-cultural constraint, be simultaneously considered and ignored, depending on the nature of the target's (i.e., e-mail sender's) blunder. This discovery suggests a possible avenue for refining attribution theory.

A common protocol for studying the fundamental attribution error entails having people (i.e., "observers") make judgments about a target individual who has written an essay the observers have read (Jones & Harris, 1967; Tetlock, 1985). The target has purportedly either chosen his or her position on the essay or been assigned to take a particular position. This protocol enables attribution researchers to examine, among other things, the degree to which dispositional attributions are reduced when a known situational influence (an assigned essay topic) constrains behavior (the essay content).

In the preceding scenario, the known power of the situation reduces dispositional attributions about the target, though it does not eliminate them altogether. In this type of experimental protocol, the situation's effect on behavior is rather clear and obvious. Such is the case for some situations encountered in the real world. For example, one might reason that for the participants in this study, writing in a foreign language has a relatively clear cut, undeniable effect on spelling and grammar errors. Given U.S. educational requirements, it is fairly safe to assume that most participants in the present investigation had experience studying a foreign language and receiving feedback on errors committed when attempting to communicate in a nonnative tongue themselves. Thus, the grammatical constraints of writing in a foreign language were likely obvious to most of our study participants.

However, a situation's effect on behavior is not always as clear cut or unequivocal as the effect illustrated in the preceding example. This is likely the case when considering culture's influence on the tone of an e-mail message. Relatively few people have presumably received direct feedback on cross-cultural communication blunders, unlike spelling and grammar errors, even if they have had the opportunity to commit them. Lack of experience and feedback are just two of the many factors that may combine to obscure the power of cultural background on one's adherence to communication norms.

It is quite possible that the equivocality of a situation's effect on behavior increases the mental effort required to correct dispositional inferences drawn during the characterization phase of person perception described by Gilbert et al. (1988). In other words, more reflection and cognitive effort may be required to complete the correction phase of person perception when the situation's effects on behavior are ambiguous. As such, dispositional inferences may be more likely to persist when the influence of a situation is equivocal. A more complex interaction is also possible, such that certain individual differences (e.g., need for cognition, "attribu-

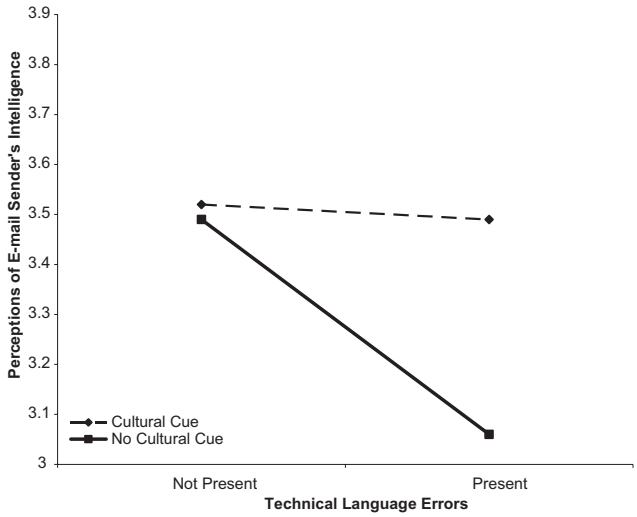

Figure 2. Interaction of technical language errors and cultural cues on perceptions of the e-mail sender's intelligence.

Table 5
MANOVA Examining the Interaction of Etiquette Deviations and the Presence of Cultural Cues on Perceptions of an E-Mail Sender

	Multivariate results					Univariate results			
Independent variable	F	*df* (between, within)	p	η_p^2	Dependent variables	F	*df* (between, within)	p	η_p^2
Etiquette deviations	16.47	4, 297	<.001	.18	Perceived agreeableness	29.08	1, 300	<.001	.09
					Perceived extraversion	61.02	1, 300	<.001	.17
					Perceived cognitive trustworthiness	5.76	1, 300	.02	.02
					Perceived affective trustworthiness	20.77	1, 300	<.001	.07
Presence of cultural cues	1.44	4, 297	.22	.02	Perceived agreeableness	.88	1, 300	.35	<.001
					Perceived extraversion	2.74	1, 300	.10	.01
					Perceived cognitive trustworthiness	1.03	1, 300	.31	<.001
					Perceived affective trustworthiness	.00	1, 300	.99	<.001
Etiquette Deviations × Presence of Cultural Cues	.16	4, 297	.96	<.001	Perceived agreeableness	.02	1, 300	.90	<.001
					Perceived extraversion	.21	1, 300	.65	<.001
					Perceived cognitive trustworthiness	.04	1, 300	.85	<.001
					Perceived affective trustworthiness	.35	1, 300	.56	<.001

Note. $N = 304$. MANOVA = multivariate analysis of variance.

tional complexity"; Tam, Au, & Leung, 2008) have the greatest effect on the tendency to account for situational influences when equivocality is high. These propositions hold promise for clarifying and refining attribution theory. They await empirical investigation.

Practical Implications and Suggestions

Aside from its theoretical implications, this study has immediate practical value for organizations and employees who use e-mail to collaborate. In general, this study suggests that organizations should test and establish interventions that encourage e-mail recipients to actively seek and obtain information about an e-mail sender's context. This will help employees identify situational constraints that may affect teammates' behavior.

Operating from a foreign location and perspective is one such constraint. The international nature of many organizations means that new collaboration partners may reside on the other side of town or the other side of the world, so to speak. Due to the lean nature of e-mail, a teammate's geographic location will not always be salient to employees. If employees do not realize that a new teammate is communicating in a second language, they are apt to assume the teammate lacks intelligence and conscientiousness when they see grammatical mistakes committed via e-mail. Once such "hypotheses" about a teammate are formed, employees may elicit, attend to, and recall information that confirms their early impressions (Van Swol, 2007). As noted by Cramton (2001), "Interpretations [of communication failures] can change people's perceptions of each other, their willingness to cooperate, and the ways in which they communicate and cooperate" (p. 350). A small miscommunication has the potential to escalate into more serious issues.

Organizations concerned with these matters should take steps to ensure that employees immediately recognize cross-cultural collaborations as such. Simply stated, an important practical recommendation from this study is to make culture salient. Social networking is one potential mechanism for accomplishing this goal. Social networking is increasingly being adapted to the business world (Bulkeley, 2007; Cosh, 2008). For example, IBM has a tool known as "BluePages," which has been described as the corporate equivalent of MySpace.com (Bulkeley, 2007); the aim is to ensure that employees feel like part of a cohesive team (Cosh, 2008). Employees control their BluePage profile, which, unlike a standard corporate directory, indicates their location, includes a picture of their choosing, and contains other information said to be useful in developing global relationships (Bulkeley, 2007; Hamm, 2009). Rather than creating an internal corporate social networking site like BluePages, other organizations have been known to hire third-party companies to host and update corporate social networks for them (Cosh, 2008). Alternatively, employees may convey information about themselves via professional networking sites that are not sponsored by their employers (Iwata, 2007); LinkedIn is an example of such a site.[2] Finally, software is currently being developed to aggregate and share social network information retrieved from a range of applications such as those described above (IBM R&D Labs in Israel, n.d.).

Regardless of technological specifics, corporate social networking sites can be utilized to explicitly relay employees' culture and language backgrounds by providing this information in the form on an online profile. Such background information can also be relayed more subtly through the corporate social networking site via photographs and personal audio clips providing speech samples. Encouraging employees to build and maintain online profiles as well as to review new teammates' profiles can help employees realize, quite literally, where their teammates are coming from. By making nationality, language, and other contextual variables salient, corporate social networking sites can help employees interpret e-mail communication received from remote teammates. In all likelihood, spelling and grammar errors will be attributed to deficits in intelligence and conscientiousness when they are committed by "local" collaborators as well as by expatriates whose online profiles indicate they are working abroad yet communicating in their native tongue. Conversely, virtual teammates whose online

[2] Half of LinkedIn's users are said to be using this networking tool in English while residing outside the United States (Iwata, 2007).

profiles suggest they are communicating in a second language are more likely to be given the benefit of the doubt.

The preceding recommendations suggest that interventions should target the e-mail recipient. However, this study also has practical implications for those constructing e-mail messages. E-mail senders should be informed of the negative attributions that can occur when poorly constructed messages are sent to new teammates. In-house training designed to help employees minimize errors in their e-mail exchanges may be in order. In addition, e-mail senders can be encouraged to take measures, when warranted, to prevent others from misattributing errors to their own dispositions. Organizations may wish to coach virtual employees to inform others (either through corporate social networking sites or through other media) about contextual constraints (e.g., language issues, disabilities, pressing timelines) that may not be apparent through e-mail communication. Conveying contextual information to an e-mail recipient could prevent the recipient from committing the fundamental attribution error, demonstrated by forming inappropriate, unjustified, negative perceptions about an e-mail sender.

Limitations and Future Research

This study is an important early step in learning how to minimize e-mail communication problems during cross-cultural collaboration. Nevertheless, it is important to acknowledge its limitations, particularly the external validity issues that are commonly associated with laboratory research. To test the generalizability of the findings of this study, researchers should examine the influence of contextual information during cross-cultural e-mail communication in an organizational setting. Field research based on exchanges drawn from actual work communications would be a valuable follow-on to the current study.

This study operationalized etiquette deviations as e-mails that were short and terse. The main effect for etiquette deviations indicates that authors of terse e-mails are considered relatively low in characteristics such as agreeableness and trustworthiness. This supports the notion that, even in a business context, people do not view such correspondence favorably. That said, it is important to point out that terse communication is not the only type of etiquette deviation possible. For example, a communication partner might violate norms by choosing words or figures of speech that are technically correct yet inappropriately informal or overly friendly. Future research should examine the effects of cultural cues on attributions stemming from other types of etiquette norm deviations that were not examined in this study. As indicated earlier, it would also be interesting to investigate whether the equivocality of culture's effects on norm violations alters the influence of cultural cues.

This study focused on a cross-cultural exchange, that is, an e-mail transmitted between members of two different countries. Implications for multicultural teams warrant investigation. Global teams consisting of members from a variety of cultures are known to be highly complex social entities fraught with challenges, such as how to achieve cohesion amid an assortment of cultural rifts (Gibbs, 2009). Increased cultural diversity can expand the range of etiquette norms implicitly assumed by team members at any given point in time, creating a dynamic in which multiple people are adhering to (and violating) a variety of dissimilar rules for expected and accepted behavior, all at once. Multicultural teams are presumably also characterized by a heightened propensity for grammatical errors due to the participation of multiple individuals communicating in a second language. Perhaps this increased propensity for grammatical and etiquette blunders will increase the occurrence of the types of negative dispositional attributions documented in this study, particularly when cultural cues are absent. Alternatively, perhaps grammatical and etiquette blunders are less likely to prompt dispositional attributions when they are committed by multiple team members rather than a single individual, as was the case in the current study. Attribution theory maintains that consensus is one determinant of our tendency to attribute the behaviors of others to their dispositions; when consensus is high, dispositional attributions are less likely (Kelley, 1967; Kelley & Michela, 1980). Consensus refers to the generality of a behavior (e.g., a communication error) across people. In the context of virtual teams, for example, consensus can refer to whether collaborators other than the teammate under consideration are also committing the communication faux pas in question. Perhaps the failure of multiple teammates to adhere to a given communication norm raises consensus, reduces the tendency to attribute e-mail violations to any one teammate's disposition, and produces a team-level norm that expects, accepts, and accommodates deviations from mainstream communication practices during multicultural collaboration.

Research by Tetlock (1985) suggests that people are more sensitive to the situational determinants of another's behavior when they feel accountable for the impressions they form. Another avenue for future research, therefore, entails examining whether accountability might encourage people to realize the powerful effects culture can have on norm violations during e-mail communication. Such accountability could be induced by having people rate virtual teammates early in the team development process and provide explanations for their ratings. From a practical standpoint, this information could be used for team-building purposes and for catching miscommunication issues before they have a chance to fester.

One important finding that emerged from this study involved the negative effects of e-mail grammar and spelling errors. There is a need for follow-up research identifying groups, other than people using English as a second language, that might be at risk for writing e-mails with a significant number of grammar and spelling errors due to contextual constraints. For example, individuals with visual impairments often use adaptive technologies that allow them to dictate text into a computer. Many of these technologies are quite good but not errorless (Speech Solutions, n.d.), and e-mails resulting from the use of these technologies may contain spelling or word choice errors. Future research should test whether the provision of additional contextual information about a communication partner's disability reduces negative attributions stemming from these mistakes.

Another worthwhile research avenue involves testing whether these findings extend to other types of lean CMC, such as chat, instant messaging, text messaging, and Twitter. For instance, the quick, synchronous nature of chat as well as the challenges of using small keyboards (such as those included on mobile phones and multifunctional devices) may prompt people to attribute spelling and grammar errors to the situation rather than the person. Similarly, the norms of rapidity and the technological features

constraining the length of Twitter and text messages may also alter expectations, such that improper spelling/grammar as well as short and pithy messages are interpreted differently in those media than in e-mail. Currently, an e-mail sent from certain mobile devices (e.g., iPhones, BlackBerrys) includes a default statement indicating that the message was sent from a mobile device. One final avenue for future research involves examining how the inclusion of this information impacts perceptions formed by message recipients.

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Appendix

Study E-Mail Containing No Technical Language Violations and No Etiquette Deviations

Hi [Name],

I hope you are doing well. I send you my greetings from [*location*], where we are experiencing some unseasonably warm weather. This is a welcome change from last week's very cold temperatures!

I wanted to drop you a line to provide a little information about myself and touch base on a few other issues. As you probably know, I work in [*X*] Division and was recently assigned to the project we'll be working on together. My background experience is in electronics.

As we work together, we should create a plan for meeting to decide how we will conduct this project. In terms of your communication preferences, what's the best way to get in touch with you?

I also wanted to mention that my supervisor has asked me to send summary reports of our work to the corporate office on a regular basis. Just let me know how you would like these reports to be structured.

Thanks,

[Name of E-mail Sender]

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