

Electronic Helping Behavior: The Virtual Presence of Others Makes a Difference

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Years of research have demonstrated that the physical presence of others can reduce the tendency to help individuals needing assistance. This study examined whether the diffusion of responsibility phenomenon extends beyond face-to-face environments and helps explain the lack of responsiveness often demonstrated by Internet users who receive e-mail requests sent to multiple people simultaneously. Participants were sent an e-mail message requesting assistance with an online library search task. Each person received the message along with an indication that 0, 1, 14, or 49 others were also contacted. The results demonstrated partial support for the study hypothesis. As expected, the virtual presence of many others significantly reduced e-mail responsiveness; however, nonresponse did not directly increase in proportion with group size.

Today, a great deal of human interaction occurs online, and people commonly use the Internet to solicit personal and professional assistance from others. The Internet offers many appealing benefits to those wishing to reach out to people for help. For example, e-mail can be used to contact many associates easily and simultaneously. Unfortunately, replies are not guaranteed, as e-mail recipients often disregard the messages they receive (Anonymous, 2000; Zhao, Kumar, & Stohr, 2000). The failure to reply to others seeking assistance from a group of e-mail contacts raises important questions about the determinants of such nonresponse. The purpose of this study is to examine one possible antecedent. Specifically, this study tests whether the willingness to reply to a person seeking assistance online decreases as the number of others included on an e-mail list increases.

THEORETICAL UNDERPINNINGS OF VIRTUAL NONRESPONSE

Clearly, the presence of surrounding group members can powerfully affect the effort expended by individuals whose input is needed. A wide range of scholarship stemming from numerous disciplines (e.g., psychology, sociology, economics, computer science, management information systems,

and computer-supported cooperative work) has addressed this phenomenon and its vast implications. Literatures including but not limited to the topics of diffusion of responsibility, social loafing, the bystander effect, cooperation and exchange, group dynamics in computer-mediated interaction, online communities, social impact theory, public goods work, and social identity all contribute valuable insights concerning the factors that explain individual efforts in group settings (e.g., Butler, Sproull, Kiesler, & Kraut, forthcoming; Marwell & Ames, 1979; Oliver & Marwell, 1988; Orbell, Van de Kragt, & Dawes, 1988; Postmes, Spears, & Lea, 2002; Preece, 1999; Prentice, Miller, & Lightdale, 1994; Resnick, Zeckhauser, Friedman, & Kuwabara, 2000; Williams, Harkins, & Latané, 1981).

Several authors (Barron & Yechiam, 2002; Lewis, Thompson, Wuensch, Grossnickle, & Cope, 2004; Markey, 2000; Yechiam & Barron, 2003) have suggested that social loafing, the bystander effect, and the diffusion of responsibility should be carefully examined to better understand the tendency to ignore people seeking assistance online from groups of others. Research in the area of social loafing demonstrates that people exert more effort when working alone than they do when they are in groups working on collective tasks (Karau & Williams, 1993). Meanwhile, the bystander effect indicates that the physical presence of others inhibits individual response when help is needed (Bickman, 1971; Clark & Word, 1972; Darley, Teger, & Lewis, 1973; Latané & Darley, 1970).

Just as gases move from higher to lower areas of concentration, the sense of accountability experienced by individu-

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als is said to disperse among others present. This diffusion of responsibility has been identified as a possible mediator of both social loafing and the bystander effect¹ (Forsyth, Zyzniewski, & Giammanco, 2002; Latané, 1981). In support of this notion, research has demonstrated that individuals are less likely to offer help when others are present (Ahmed, 1979; Latané & Darley, 1970; Levy et al., 1972). Individuals within a group are likely to give less money than individuals alone when asked for contributions from a begging child (Thalhofer, 1971) or a charity organization (Wiesenthal, Austrom, & Silverman, 1983), as well as when leaving a tip for a waiter (Freeman, Walker, Borden, & Latané, 1975).

Diffusion of responsibility appears to trigger other group-level phenomena in addition to social loafing and the bystander effect. For example, it is said to mediate people's reactions to resource dilemmas (Fleishman, 1980; Forsyth et al., 2002). Accordingly, reactions to resource dilemmas, which are central to public goods and game theories, may further explain the problem of virtual nonresponse (Yechiam & Barron, 2003). Otherwise known as the free-rider problem in economics, the irrationality of voting in political science, and the prisoner's dilemma in psychology (Marwell & Ames, 1979), public goods and game theories suggest that the knowledge that others share responsibility in the same task creates a sufficient condition for the diffusion of responsibility to occur. If more people are asked for help and more people give help, then one's own helpfulness is less valuable. In the context of e-mail correspondence, only one recipient is often needed to volunteer his or her time (i.e., reply) to accomplish the outcome preferred by all (i.e., answer a question posed online). Assuming that someone else has answered the question, the utility of not responding (time savings) is higher than the utility of responding (time wasted). As Yechiam and Barron (2003) suggested, the resulting consequence for virtual interaction is that recipients most prefer to respond when they feel no one else will reply, and they will prefer not to respond otherwise. Consequently, the probability of responding should decrease as the number of others present increases.

Even though the diffusion of responsibility has been extensively studied for many years and in a wide variety of contexts, unanswered questions remain. Recent work by Forsyth and colleagues (2002) helped clarify one puzzling aspect of the phenomenon by testing whether responsibility directly increases in proportion with group size. Asserting that theoretical models developed to explain conformity and influence offer insights about how responsibility diffuses in groups of varying sizes, the authors outlined several such models, in-

cluding Latané's (1981) social impact theory (SIT), Mullen's (1983) other/total ratio (OTR) model, and Tanford and Penrod's (1984) social influence model (SIM). SIT predicts that each additional person will stimulate additional diffusion. Similarly, OTR suggests that members of two-person groups will experience half of the responsibility, members of four-person groups will accept 25%, and so on. To the contrary, SIM "implies that members of dyads will diffuse less responsibility than that predicted by OTR or SIT but that members of larger groups will diffuse responsibility at relatively equal rates" (Forsyth et al., 2002, p. 55). After considering these models, the authors asked members of two-, four-, six-, and eight-person groups to complete an additive, compensatory task and then allocate 100 responsibility points to themselves and the other members. The results, which closely mirrored OTR and SIT predictions, supported the authors' hypothesis that responsibility diffuses in proportion to group size.

DIFFERENCES BETWEEN FACE-TO-FACE AND ONLINE HELPING

Although past research and theory suggests that e-mail responsiveness decreases in proportion to group size, this notion needs to be tested. We cannot simply assume that online interaction is an innocuous adaptation of the physical, face-to-face world in which original group theories were developed. Indeed, research has demonstrated a number of differences between the processes underlying face-to-face versus computer-mediated interaction (Adrianson & Hjelmquist, 1991; Dubrovsky, Kiesler, & Sethna, 1991; Kiesler, Siegel, & McGuire, 1984; McLeod, Baron, Marti, & Yoon, 1997; Siegel, Dubrovsky, Kiesler, & McGuire, 1986; Smilowitz, Compton, & Flint, 1988; Straus, 1996; Straus & McGrath, 1994; Weisband, 1992).

Clearly, the analog between face-to-face and online helping behavior is far from perfect, and differences between online and face-to-face helping could have important implications for the factors presumed to mediate the effects of group size on helping. Whereas face-to-face individuals can typically see and hear other group members, people on an e-mail list must assume the presence or absence of others via the names in the Sent To field or the message content (e.g., "Hi everyone" in the greeting). Unlike their face-to-face counterparts, virtual group members may question whether others on an e-mail list actually received a sent message. This uncertainty can stem from a recipient's consciousness of the degree to which people fail to check their e-mail accounts and delete others' messages either intentionally or unintentionally (e.g., when messages from unknown senders are automatically sorted into "junk e-mail" folders).

Moreover, when someone else helps in a face-to-face setting, that information is known. Via e-mail, group members are not privy to this information when those who respond do

¹The bystander effect has also been attributed to pluralistic ignorance, which indicates that the presence of other nonresponsive bystanders can cause onlookers to interpret the situation as one in which help is not necessary (Miller & McFarland, 1987). This explanation did not apply to this study, which focused on the failure to respond to explicit, unambiguous requests for assistance.

not “reply to all” simultaneously. The lapse between the time at which a message is sent and the time at which it is read also poses some unique problems in online environments and may shape the willingness to reply to an e-mail message sent to a group of people. In all likelihood, the greater the time lag, the less likely the recipient is to help, especially if the request was sent to many others. Group members who receive dated e-mail requests may assume others read and responded to the same message earlier and may feel they have no chance of being the helper.

It should be noted that the communication medium might also moderate a group member’s ability to easily gauge the number of others present. In particular, variance in the size of large groups may be easier to detect face to face than it is online. With many e-mail applications, only the first 10 to 15 names in the group are immediately visible; a scroll bar allows recipients to view additional members’ names if they wish. Thus, whereas the difference between 15 and 50 others would be readily detectable in a face-to-face environment, this difference may be less noticeable online.

Yet another feature of computer-mediated helping that is very different from the face-to-face situation occurs when one person is asked for assistance. Some applications allow senders to easily personalize messages by placing single names in the header of e-mail delivered to numerous people. Consequently, whereas individuals singled out in a face-to-face manner typically know they are alone, their online counterparts may doubt whether they are truly unaccompanied. Lastly, spam has no direct face-to-face equivalent; certain aspects of the annoyance and imposition experienced by recipients of mass e-mailings are unique to online interaction. For instance, people may be suspicious that online help seekers simultaneously contacting large numbers of unknown others are surreptitiously building and validating lists of contacts, to which spam will be delivered in the future.

PAST INVESTIGATIONS OF VIRTUAL NONRESPONSE

To date, only a few studies have touched on issues related to the virtual diffusion of responsibility. Markey (2000) published a correlational study examining helping behavior in a chat room. Over a 30-day period, a confederate logged on to 400 different chat rooms, recorded the number of others present (which ranged from 2–19), and then asked for information on how to look up a profile within the chat room. When the request for help was directed to the entire group, the results revealed a positive correlation between the number of people present in the chat room and the amount of time it took to receive help. This correlation nearly disappeared when help was requested by specifying a bystander’s name.

Although informative, Markey’s (2000) study did not provide conclusive evidence concerning the degree to which the virtual presence of others affects helping behavior when re-

quests for assistance are delivered via e-mail. Because the study did not examine the behavior of lone recipients, it is impossible to determine whether the behavior of unaccompanied individuals differs from that of recipients “surrounded” by others in a chat room. Also, it is unclear whether the results generalize to other forms of computer-mediated communication, such as e-mail. Third and finally, the absence of random assignment and the nonexperimental design of Markey’s study preclude causal interpretations.

Moving beyond chat rooms, Yechiam and Barron (2003) examined the virtual diffusion of responsibility by sending a request to complete an online survey to either individuals or Listservs. Whereas only 6% of the Listserv members clicked on the survey link embedded in an e-mail message asking for survey responses, nearly 17% of those individually contacted did so. Surprisingly, of those who accessed the online questionnaire, the proportion that completed the survey was higher in the Listserv condition (50%) compared to the individual condition (36%).

Barron and Yechiam (2002) emphasized the differences between social interactions occurring via e-mail versus those occurring in “virtual publics” (e.g., newsgroups, Listservs, etc.). Noting that “there seems to be substantially less experimental work focused on the social interactions in private e-mail communications” (p. 508), they designed a study to address this deficiency. A confederate used e-mail to contact participants either individually or with four others. The message asked recipients to indicate whether a particular university had a biology faculty. Results showed that those contacted alone were more helpful and produced a higher rate of response compared to those contacted with four others. Thus, Barron and Yechiam’s study provided a valuable addition to the literature, producing initial evidence that the presence of others reduces the willingness to reply to e-mail. To date, we do not know whether these results generalize to more demanding requests, which require effort beyond a yes–no response. More important, the dichotomous independent variable examined in Barron and Yechiam’s study precluded an examination of whether responsibility diffuses in proportion to group size. Would a member of a dyad be half as likely to reply as a lone e-mail recipient?

Most recently, Lewis et al. (2004) expanded the group size variable in their survey response study. Participants received an e-mail message from a graduate student soliciting responses to an online questionnaire. Whereas some recipients received the message alone, others were led to believe that 1, 14, or 49 others also received the survey link. Contrary to the study’s hypothesis, the participants in the four conditions did not differ in terms of response rate. Lewis et al. pointed out that the lack of significant findings may have been due to the nature of the request. Most surveys need to be completed by many people. Even a person whose name appears alone in the Sent To portion of the message is therefore likely to assume that the request was sent to many others. Perhaps this explanation also helps account for the unanticipated pattern of re-

sponses produced by the individual versus Listserv participants who accessed Yechiam and Barron's (2003) online questionnaire.

THIS STUDY

Although recent work has begun to address virtual helping behavior, questions remain. Is the probability of an e-mail response an inverse function of the number of people contacted by a private e-mailer with a request that can be completely granted by a single person? To date, no study has addressed this question. Forsyth et al. (2002) found that in face-to-face environments, responsibility diffuses in proportion to group size. This study therefore hypothesized that people interacting in an e-mail environment would behave similarly.

Hypothesis: Responses to an electronic plea for help will decrease as the number of others electronically present increases.

METHOD

Participants

A total of 400 students enrolled in graduate-level courses at a Southeastern university participated in the study. Graduate students from online courses were targeted to avoid sending messages to inactive e-mail accounts.

Design and Procedure

An experimental confederate posing as a naive student sent participants the following e-mail message:

Hi. I'm a student here at ECU. One of my professors said that I could get articles on-line from the Joyner library Web site instead of looking them up in the library itself. But, the library's Web site is not the easiest thing in the world to find (I've looked everywhere!). Would [*you; one of the 2 of you; one of the 15 of you; one of the 50 of you*] mind sending me the Web address/URL for Joyner Library? I noticed the ECU e-mail address book has you listed as "student," so I thought you might know. Thanks!²

Recipients did not know they were participating in a study and thus likely assumed that the message they received was from an unknown university student. The participants were randomly assigned to one of four conditions, where they were led to believe that 0, 1, 14, or 49 others also received the request.

²The message included two misspellings in hopes that participants who received the e-mail would perceive the message to be one written in haste by a peer.

Group size was manipulated via the number of names appearing in the header (i.e., the Sent To portion of the e-mail). The names of the study participants assigned to the 2-person condition appeared second, those in the 15-person condition appeared seventh, and those in the 50-person condition appeared 26th. The "others" names were fictitious. As suggested by the information italicized in the preceding e-mail message, the group size manipulation was also reinforced in the body of the message.

The e-mail messages sent to the participants were created in advance so there would be no significant variance in the date and time at which the students received the requests for assistance. The messages were sent from a student's university e-mail account. The amount of time that it took to respond was not considered, as there was no sufficient way to record the time in which the participant received, accessed, and responded to the e-mail message (pilot work indicated that read receipts and other such functions were highly unreliable estimates of message retrieval times). The data collection period extended for 2 weeks, during which time no official university breaks occurred.

A coding scheme was developed to classify reactions to the online plea for assistance according to the degree of help provided. Each participant could reflect one of four levels of helping behavior by offering no assistance, that is, failing to reply (0); extending minimal assistance by politely replying without offering direct help³ (1); providing moderate assistance by sending instructions or a link (2); or extending maximum assistance by providing descriptive instructions along with a Web link and/or an offer to assist further if needed (3). Overall, the four response categories represented an ordinal ranking of levels of helpfulness.

RESULTS

At the end of the 2-week period, 99 (25%) of the 400 participants had responded. The 301 students who failed to respond to the confederate requesting online support were automatically assigned to the no assistance category, and the first two authors used the scale described previously to independently rate the helpfulness of each of the 99 replies. These 99 ratings were used to compute an intraclass correlation (ICC) coefficient to verify that the level of assistance demonstrated in the e-mail replies could be reliably assessed. Results revealed that the two sets of 99 ratings overlapped considerably, producing an ICC of .809, which is commonly considered an acceptable level of interrater reliability (Nunnally & Bernstein, 1994). The first author's categorizations were used to compute subsequent analyses on these data.

³A cordial response lacking substantive information was considered a minimal level of helpfulness because in replying, the participant provided useful information indicating that the student in need should pursue other avenues rather than waiting for assistance from the participant in question.

Test of the Hypothesis

The hypothesis predicted that as the number of virtual others increased, helping would decrease. Table 1, which shows the degree to which participants in each of the four conditions helped the confederate requesting online assistance, reveals an association between the number of recipients in the e-mail list and helping behavior. A 4 (recipient list size) \times 4 (level of helping behavior) Pearson chi-square analysis corroborated this conclusion, thereby providing initial support for the study hypothesis and indicating that the e-mail list size manipulation affected virtual helping behavior, $\chi^2(9, N = 400) = 27.67, p < .001$.

The distribution of responses in the 1-person condition was nearly identical to the responses of those in the 2-person condition; consequently, an analysis comparing the differences between these two groups was far from significant, $\chi^2(3, N = 200) = 1.03, p = .794$. Similarly, there was no significant difference between the distributions of responses for the 15- versus the 50-person group, $\chi^2(3, N = 200) = 1.40, p = .706$. The 1- and 2-person groups' data were therefore collapsed, as were the 15- and 50-person groups' data, to compare the differences between the conditions with few versus many recipients. The merged data confirmed that those who received the request with no or few others provided significantly more assistance than did those who received the message with many others, $\chi^2(3, N = 400) = 25.44, p < .001$. Collapsing the four types of responses into two categories labeled "did not reply" and "did reply" led to similar conclusions. Overall, 36% of those who received a message with no or few others offered some type of reply, whereas significantly fewer (14%) of those who received the message with many others responded to the e-mail plea for assistance, $\chi^2(1, N = 400) = 24.82, p < .001$. In sum, the study hypothesis was partially supported. Although the virtual presence of many others clearly reduced e-mail responsiveness, nonresponse did not directly increase in proportion with group size.

Follow-Up Analysis

Subsequent analyses included only the data from the 99 people who replied to the confederate. In all cases, less than a quarter of the helpers provided minimal assistance, at least

half offered moderate assistance, and more than a quarter but less than half extended maximum assistance. A 2×3 Pearson chi-square analysis examined whether the proportion of helpers offering the three types of assistance (minimal, moderate, maximum) varied across the few and many conditions. Although the number of others in the recipient list affected the decision to assist, there was no evidence that the volume of virtual bystanders influenced the amount of help participants provided after deciding to aid the confederate requesting online assistance, $\chi^2(2, N = 99) = .767, p = .682$.

DISCUSSION

In accord with the study hypothesis, the data clearly supported the assertion that the virtual presence of many others inhibits e-mail responsiveness. Contrary to our expectations, however, unresponsiveness did not directly increase in proportion with group size. This is the first study to show that a virtual diffusion of responsibility occurs, but the effect of others is not necessarily linear.

Our results showed that the distribution of responses for the 1-person (alone) condition was nearly identical to the distribution of responses for the 2-person (1 other) condition. Likewise, the distributions for the 15- and 50-person conditions were very similar to each other. This finding is inconsistent with the face-to-face study by Forsyth et al. (2002), which supported Latané's (1981) SIT and Mullen's (1983) OTR model and indicated that the responsibility sensed by individuals in groups tends to diffuse in proportion with group size.

Instead, our findings more closely reflect Tanford and Penrod's (1984) social influence model, which suggests that (a) members of dyads behave very similarly to individuals operating alone, (b) people are noticeably influenced by groups of three or more, and (c) "a ceiling effect occurs after that point, with the result that increasing the number of people does not increase the group's influence" (Forsyth et al., 2002, p. 55). The classic conformity study by Asch (1955) illustrates this contention. Asch discovered that those faced by an opposing opinion of only one confederate almost never conformed to the confederate's viewpoint. When two con-

TABLE 1
Relation Between the Number of Recipients and the Amount of Assistance Provided

Number of Recipients	Level of Assistance								Total N
	None		Minimal		Moderate		Maximum		
	n	%	n	%	n	%	n	%	
Alone	62	62.0	4	4.0	19	19.0	15	15.0	100
1 other	67	67.0	2	2.0	18	18.0	13	13.0	100
14 others	86	86.0	3	3.0	7	7.0	4	4.0	100
49 others	86	86.0	1	1.0	7	7.0	6	6.0	100

Note. Percentages provided are based on the group total that appears in the same row.

federates were included, the participant conformed 13.6% of the time. When the number of confederates increased to three, the participant conformed 31.8% of the time. However, increasing the number of confederates in the room to more than three did not cause a significant increase in conformity. Notably, the ceiling effect of many others may be especially likely via e-mail, where 15 and 50 simultaneous addressees may look and feel similar to recipients who must scroll to view names beyond the first several entries.

It is important to point out that a number of past face-to-face studies suggest the physical presence of one other person inhibits helping behavior (Bickman, 1971; Clark & Word, 1972; Latané & Darley, 1968; Levy et al., 1972; Ross & Braband, 1973). Thus, the lack of difference between our 1- and 2-person conditions contradicts past research specifically looking at helping behavior in the presence of others. This finding warrants speculation and further investigation. Perhaps differences between e-mail and face-to-face interactions affect factors presumed to mediate the diffusion of responsibility in the presence of one other person. Maybe individuals in online groups of two question whether their partner received the e-mail and therefore feel more alone than their face-to-face counterparts. In addition, perhaps those in the 1-person condition feel less alone than their face-to-face counterparts due to a suspicion that the sender's e-mail software allowed single names to appear in the header of messages delivered to numerous people. Either or both of these assumptions, which do not apply to face-to-face encounters, could have equalized the response rates of people in the 1- and 2-person conditions and accounted for the unexpected similarity, which diverged from the outcome commonly uncovered during face-to-face helping research.

Although Lewis et al. (2004) assigned participants to the same conditions examined in this study (0, 1, 14, and 49 others), they found no significant differences with regard to response rate. The authors acknowledged that participants in all four of their conditions may have assumed that many others were asked for help due to the nature of the survey completion request they delivered. The discrepancy between these findings and those uncovered by Lewis et al. certainly supports the authors' assertion that the nature of requests for help may moderate the effects of recipient list size.

Limitations and Future Directions

This study was confined by certain limiting factors, which should be noted and addressed in future research. In particular, the boundary conditions of these findings are presently unclear, and it is important to consider the degree to which our results generalize to other people (e.g., nonstudents), requests (e.g., those requiring responses from more than one person), and settings. For example, the anticipation of future interaction with either the help seeker or fellow bystanders may moderate the effects of others on virtual helping behav-

ior. On a related note, both the help seeker and the bystanders included in this study were unfamiliar others. Future work should investigate whether these findings replicate when either or both of these roles are occupied by acquaintances.

At times, individuals who are familiar with fellow group members are inclined to informally assess each other's ability to help. In this regard, the presence of many others may have little or no influence on recipients who feel especially qualified or able to assist. In a classic example, Bickman (1971, 1972) found that individuals were not affected by the presence of nonresponding bystanders if the bystanders were not in a position to offer help. In the case of e-mail communication, someone who recognizes that the many other names on the recipient list belong to individuals who are relatively unqualified to address the request might be more likely to offer assistance than a person who receives a request along with many qualified or unfamiliar others. Research examining this possibility would provide a useful addition to the literature.

Lastly, future studies should examine whether lapses between the time at which a message is sent and the time at which it is read influence the inclination to assist and whether the recipient list size moderates this effect. Face-to-face studies involving onlookers at accidents have revealed that people who reach an accident scene relatively late feel less responsible for helping than do those who arrive early on (Cacioppo, Losch, & Petty, 1986). A similar phenomenon may occur when people receive dated e-mail requests.

Implications

From a practical point of view, this research offers guidance for those who contact numerous others in hopes of receiving a response from each person on the e-mail list. In such situations, the person requesting assistance may benefit from conditions that discourage diffusion of responsibility and encourage social facilitation. The presence of others is said to prompt social loafing when it interferes with evaluation potential and social facilitation when it facilitates evaluation potential (Gagné & Zuckerman, 1999). Both social dynamics and software features can help create an environment that promotes input. From an interpersonal standpoint, asking members to share replies with the e-mail group and publicly thanking contributors, for example, may help encourage accountability and motivate responses to help seekers. Those designing technology for groups might also consider whether software features that give credit to contributors and publicly track or reinforce participation could help discourage diffusion of responsibility and encourage input when queries are sent to large numbers of people simultaneously. Several authors (e.g., Butler et al., forthcoming) have underscored the importance of understanding the factors that affect members' motivation to help maintain and advance the Listservs to which they belong. To the extent that these findings generalize beyond private e-mail, this study may provide useful insights for online communities.

From a theoretical standpoint, this study examined the possible boundary conditions of past theories of group behavior and social influence. According to McGrath (1990), research examining the social psychological processes underlying virtual collaboration can “be designed so that it helps us learn about effective uses of technological tools in groups at the same time as it will contribute to our basic knowledge about group process and performance” (p. 59). We hope future studies will continue to examine computer-mediated communication from a theory-driven perspective, as such an approach promises to increase our comprehension of computer-supported cooperative work in particular while advancing our understanding of group behavior in general.

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