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E-Mail Communication and Group Cooperation in Mixed Motive Contexts

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E-Mail communication and group cooperation in mixed motive contexts

Abstract

Two empirical studies are presented that explore *how* and *why* e-mail communication (versus face-to-face communication) influences cooperation in mixed motive group contexts. Results indicate that, relative to those engaging in face-to-face interaction, those who interacted via e-mail were (1) less cooperative and (2) felt more justified in being non-cooperative. Feelings of justification mediated the relationship between communication media and the decision to cooperate or not.

Key words: E-mail; cooperation; group work; decision-making; social dilemmas

E-Mail communication and group cooperation in mixed motive context

The Internet has had a significant impact on the way people communicate within and between organizations (Friedman, 2005; Katsh & Rifkin, 2001; Kiesler & Sproull, 1992; Kraut *et al.*, 2006). These changes span everything from the way co-located individuals interact on a daily basis to the emergence of entirely virtual "workplaces." Accordingly, computer-mediated communication, such as e-mail, now represents an indispensable business and managerial tool. One of the most tangible ramifications of the new communication tools at our disposal is the rise in virtual, or non-co-located, groups (Maruping & Agarwal, 2004). Therefore, in the context of group work, face-to-face interaction between members is no longer the primary default mode of communication (Alsop, 2003; Fisher, 2001; Kraut et al., 2006; Maznevski & Chudoba, 2000).

While there are obvious advantages in terms of speed, efficiency, and opportunity to the use of computer-based communication tools such as electronic mail (e-mail), there may also be potential drawbacks. After all, e-mail communication can influence both the process and the outcome of group work (e.g., Bochet *et al.*, 2006; Carey & Kacmar, 1997; Kirkman *et al.*, 2004, 2006; Kurtzberg *et al.*, 2005; Maruping & Agarwal, 2004; Siegel *et al.*, 1986). In this paper, we explore the common group situation in which individual members are presented with mixed motivations – a choice between their own personal well being or that of the as a whole group (often referred to as a social dilemma) – and explore *how* and *why* e-mail communication, versus face-to-face communication, may influence the decision to cooperate with the collective. Although a notable stream of research has explored cooperation in group contexts (e.g., Drolet & Morris, 2000;

Komorita & Parks, 1994; Sally, 1995), very few have explored the influence of e-mail communication (see Morris *et al.*, 2002; Wilson *et al.*, 2006), and those empirical studies that exist do not explore *why* e-mail may influence cooperation in a virtual setting, and that is a goal of this research. As such, our findings contribute to the intersection of two streams of literature: decision making and computer-mediated communication.

Thus, we aim to empirically explore the psychological mechanism behind individual-level cooperation as a function of communication media. While most prior research on online groups has focused solely upon decisions made at the *collective*-level, the present research further advances this literature by exploring *individual*-level decisions to cooperate or not; this makes it more representative of mixed motive group tasks. Group members in mixed motive contexts are not necessarily mirror images of each other, even in a group agreeing to a common course of action. And for groups in which members have some level of autonomy, each member can still make individual-level decisions that, in turn, influence the collective well-being. By exploring the possible psychological mechanisms, such as perceptions of justification, at the individual-level, we aim to further our understanding of human-computer interaction when it comes to an individual's decision to cooperate with the group.

We will first review the existing literatures on computer-based communication and group work and will then review the factors that may promote (or hinder) the decision to cooperate in a mixed motive group context. Finally, we will present two experimental studies testing our propositions that integrate the various streams of literature.

ONLINE COMMUNICATION AND GROUP WORK

Communicating via e-mail is distinctly different from other forms of media (e.g., face-to-face, telephone, video, etc.) due to a combination of physical and psychological features. In particular, e-mail is text-only and thus removes both, body language and aural cues. In addition, the lack of synchronicity in e-mail communication can contribute to a reduced sense of immediacy in the interaction. Psychologically, there tends to be a greater sense of removal, or distance, from the other party when one cannot see or hear them, which is often referred to as a lack of "social presence" in the literature (see Barry & Fulmer, 2004). Finally, there is also a tendency towards a greater sense of informality associated with the use of e-mail relative to written or spoken communication (Kurtzberg *et al.*, 2006). Taken together, there are some unique features of this form of communication that may influence the dynamics of interaction between individual group members.

Indeed, prior research has already established that online communication does systematically affect group dynamics relative to face-to-face interaction. Two notable systematic differences include the increased time that online group work tends to take to complete a task (Carey & Kacmar, 1997; Dennis *et al.*, 1997; Dubrovsky *et al.*, 1991; Gallupe & McKeen, 1990; Hollingshead, 1996a; Olarniran, 1994; Siegel et al., 1986; Smith & Hayne, 1997), and a tendency towards lower satisfaction in the overall process for online groups (Carey & Kacmar, 1997; Dennis et al., 1997; Gallupe & McKeen, 1990; Huang *et al.*, 1999; Ocker & Yaverbaum, 1999; Strauss, 1996).

Regarding the outcome efficiency of online group work, the evidence is mixed. Some research suggests that working online results in more effective outcomes, as faster and better-organized information is distributed among group members (e.g., Gallupe &

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McKeen, 1990; Hollingshead, 1996b; Smith & Hayne, 1997). Greater participation, synergy, and structure via this medium can also lead to better outcomes and an easier process (Aiken & Riggs, 1993; Dennis & Valacich, 1993). Other research suggests, however, that working online results in *less* efficient outcomes (e.g., Carey & Kacmar, 1997; Dennis et al., 1997; Ocker & Yaverbaum, 1999), as the difficulties faced in communicating and coordinating efforts mount. Decisions made by online groups also tend to be more risky than those made by face-to-face groups (McGuire *et al.*, 1987), and consensus on difficult or complex issues is harder to reach (Hiltz *et al.*, 1986). Although a recent meta-analysis suggests that for groups working on tasks with no time limit there is no difference in performance as a function of communication media (Baltes *et al.*, 2002), in the fast-paced world of contemporary organizations time limits are a constant constraint. Accordingly, the growing consensus among researchers is that although online communication makes group collaboration more convenient and is often less expensive than meeting face-to-face, caution should be exercised because questions arise as to whether it is an enhancement or detriment to overall group performance and related social dynamics.

A related stream of research concerns negotiation effectiveness in e-mail versus face-to-face settings. In particular, research has shown that online dyadic negotiations (i.e., one-on-one negotiation) tend to be characterized by lower levels of interpersonal trust (e.g., Naquin & Paulson, 2003), and difficulty in building positive interactions and rapport (e.g., Moore *et al.*, 1999; Morris *et al.*, 2002). This can take its toll on a negotiation process particularly in terms of being able to complete a negotiation at all (Purdy *et al.*, 2000). Thus, since negotiating parties are not only physically separated by

objective distance, but are also psychologically distant, they may display more confrontational behavior and end up with no agreement at all as a result. This is consistent with research on increased exploitation when one is removed (physically and psychologically) from another (Kelman & Hamilton, 1989).

In terms of negotiated outcomes, however, the empirical evidence is mixed on how e-mail communication influences the likelihood of reaching integrative outcomes (i.e. outcomes with greater value overall) compared to face-to-face communication. Some studies have found e-mail communication (versus face-to-face) to result in less integrative final deals (Croson, 1999; Drolet & Morris, 2000), while others have found no effect for medium choice in the level of integrative outcome (Barsness & Tenbrunsel, 1998; Naquin & Paulson, 2003; Paulson & Naquin, 2004).

It is important to remember that negotiations differ from social dilemma situations in two important ways. First, the goal of a negotiation is more straightforward in the sense that one is more purely trying to maximize one's own outcome, and integrative processes are used as a tool in that search. Second, negotiation discussions are a process of *joint* agreement or consensus-forming, whereby the final decisions get created together during the course of the interchange. One person in isolation cannot achieve a negotiated deal without the consent of the other party or parties. In social dilemma situations, on the other hand, the moment of decision rests entirely with each individual, and discussions merely allow for signaling about intentions. Thus, while it is clear that e-mail influences the relationship between negotiating parties, it is not obvious how these results may influence the level of cooperation in a social dilemma context.

Overall, the above findings highlight the inherent complications that can result from text-only communications that face-to-face interactions may avoid. Therefore, *how* you communicate a message or perform a task can have an impact on the process and the results, both in terms of outcome efficiency and psychological implications. As mentioned earlier, the present work expands on this small but growing stream of research by empirically investigating how and why the choice of communication media (e-mail versus face-to-face) influences a particular aspect of group dynamics. Specifically, we focus on mixed motive situations, in which an individual must decide whether to benefit one's self-interest or to benefit the collective good. We next turn our attention toward those factors that make people tend to cooperate with the collective, as opposed to focus on the self, at the expense of the group.

COOPERATION IN MIXED MOTIVE GROUPS

Though groups are often defined in terms of their interdependence, it is important to remember that group members may have mixed motives in that they can simultaneously have individual goals that are at odds with the well-being of the group (Katzenbach & Smith, 1993; Thompson, 2004). Thus, groups are here defined simply in terms of having some degree of member interdependence to produce an outcome, whether by choice or by assignment. This interdependence can take positive (cooperative) or negative (competitive) forms. Research has shown that cooperation among group members – cooperation is defined here, and commonly defined in the literature, as acting in ways that benefit the entire group, whether or not that is to the advantage of the individual – can lead to a host of positive dynamics such as better communication, more discussion and acceptance of others' ideas, more satisfaction

among group members, better coordination, and higher productivity (Deutsch, 2001). However, in many cases, groups are neither purely "cooperative" nor "competitive" due to the inherent mixed-motive nature of many group tasks (De Cremer & van Knippenberg, 2002).

We focus on a mixed motive situation in which individual group members must decide to what degree they will cooperate with the collective versus maximize their personal gains. Such mixed motive group situations are known in the literature as social dilemmas, and they challenge individuals to balance these two conflicting sets of incentives. These individual decisions then combine to create a group-level effect, such that if "decision makers decide in favor of personal rather than collective self-interest, the final outcomes will ultimately be worse than if individuals decide to contribute to the group" (De Cremer & Leonardelli, 2003; p.168). Many organizational decisions can be characterized as social dilemmas (Tenbrunsel & Messick, 1999). Everything from budget allocations to use of office supplies can be thought of in these terms. That is, each person (or department or other group) is individually better off by allocating a greater share of the resource for themselves; but if all parties followed this procedure, they would eventually suffer more from the depletion of the resource than any would have if they had shown more restraint and concern for the common good.

It is important to reiterate that although social dilemmas involve a collective, the actual decision-making power rests at the individual, and not the group, level. A significant stream of research has explored a number of factors influencing an individual's willingness to cooperate with others in such group contexts. In particular, this body of research has tended to focus on a specific type of social dilemma involving

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public goods in which individuals must conserve a public resource in order to maintain its presence over time (see Komorita & Parks, 1994). In these public goods social dilemmas, a group member must weigh the relative merits of maximizing his or her own outcome in the short term with the long-term sustainability of a public resource (such as public ranching land, water, or a fish population). The temptation to maximize one's own profit in the short term is always present, and without strong social psychological reinforcement that cooperation is the right thing to do, many people will make non-cooperative decisions in the end (Sally, 1995; Thompson, 2001). Although not exhaustive, social psychological reinforcement most commonly tends to come by way of four means: (1) communication (Chen & Komorita, 1994; Kerr *et al.*, 1997; Kerr & Kaufman-Gilliland, 1997; Komorita & Parks, 1994; Liebrand *et al.*, 1992; Messick & Brewer, 1983; Sally, 1995; Wade-Benzoni *et al.*, 2002), (2) the degree to which individuals derive their identity from the group (Bouas & Komorita, 1996; Dawes & Messick, 2000; De Cremer & van Dijk, 2002; De Cremer & van Vugt, 1999; Messick, 1999), (3) the amount of personal contact that individuals have had with the group members (Thompson, 2001), and (4) the degree to which the individual believes the other group members intend to be cooperative (Pillutla & Chen, 1999; Wade-Benzoni *et al.*, 1996a; Wilke & Braspenning, 1989).[5]

As mentioned previously, although a notable stream of research has explored cooperation in group contexts, at present few studies have explored (1) the influence of e-

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[5] Although there are some studies that elucidate personality characteristics that affect one's decision to cooperate or not (e.g., Hertel *et al.*, 2000; Kerr & Kaufman-Gilliland, 1997; e.g., Kramer *et al.*, 1986) the bulk of research has addressed situations under which people are more likely to focus on either the individual or the collective needs in social dilemma situations, and we follow in the line of this situationally-based research.

mail communication or (2) the reasons *why* e-mail may influence cooperation in a group

setting (see Jensen et al., 2000). These are the goals of this research.

COOPERATING VIA E-MAIL

In line with previous findings, we expect to see significant obstacles to

cooperation in groups that interact only via e-mail, due to both the physical and

psychological limitations described previously. In terms of the physical limitations,

research in this area has demonstrated the superior value of face-to-face interaction over

other communication media, theoretically based on the fact that media channels differ in

their ability to transmit visual cues and nonverbal behaviors (Barry & Fulmer, 2004; Daft

& Lengel, 1986; Sproull & Kiesler, 1986). Face-to-face communication is thus

considered a more "natural" form of interaction (Kock, 2004) than is phone or e-mail.

Although they did not study e-mail specifically, Drolet and Morris (2000) found that

when unfamiliar individuals have an opportunity to engage in conversation with each

other prior to completing a mixed-motive task alone, face-to-face communication appears

to be a more efficient medium than telephone for building rapport and cooperation.

Specifically, they demonstrated that nonverbal communication and visual cues in face-to-

face settings can help group members build rapport and thus foster higher levels of

cooperation as compared to those individuals who communicate by telephone only.

Psychological distance has also been proposed as a possible explanation for observations

of increased negativity online as compared to face-to-face interactions (Kiesler &

Sproull, 1992), as well as greater difficulty building and maintaining satisfying

relationships (e.g., Carnevale & Probst, 1997; Jarvenpaa & Leidner, 1999).

We argue that the online environment will allow for a more self-centered focus within social dilemmas, leading to less cooperation overall than face-to-face interaction, not only because of the reduced psychological presence that group members have online, but also because of their subsequently lowered expectations about the cooperativeness of other group members' behaviors. In particular, Rapoport (1985) demonstrated that in a public goods dilemma one's choice of whether to cooperate or not depends largely upon expectations of other members' behaviors. Therefore, if individuals expect other group members' cooperation levels to be low, they will be less likely to cooperate themselves. On the other hand, thinking about others' personal and situational constraints can help individuals to better understand the motivations behind other group members' behaviors, which could possibly promote higher degrees of cooperation among group members. Specifically, we know from prior research that when parties in a social dilemma are better able to take others' perspectives into account, they are more likely to be cooperative with the collective (Wade-Benzoni et al., 1996a). However, taking into account other perspectives requires getting to know other group members, and such personfication tends to be more difficult in online contexts (Moore et al., 1999; Morris et al., 2002). Specifically, this "getting-to-know-you" process is less likely to spontaneously occur through e-mail, due to the limited communication, interaction, and trust that result from online settings (Barry & Fulmer, 2004; Daft & Lengel, 1986; Paulson & Naquin, 2004). Based on this, we hypothesize the following:

> *Hypothesis 1*: Group members in a mixed motive situation (e.g., a social dilemma) who communicate online will exhibit lower levels of cooperation than will those who have interacted face-to-face.

We now turn our attention toward an empirical examination of this basic hypothesis.

STUDY 1

Method

Sample and Research Design

Participants were 120 undergraduate business students enrolled in either organizational behavior or negotiation classes. The participants represented a cross-section of the junior- and senior-level undergraduate business school population, which has an average age of 20.8 years old and is 46% female. Participation was part of a class assignment.

Participants were randomly assigned to groups consisting of four members. The groups were then randomly assigned to one of two modes of communication, with 14 groups interacting via e-mail and 16 groups interacting in a face-to-face manner.

Group Task

Participants were presented with the task of deciding whether to cooperate with their fellow group members or not on a task that involved the possibility of real monetary gain. All participants were given a $7.00 certificate redeemable at campus eateries. These certificates were given to them in unsealed envelopes with each person's name written on the outside of his or her envelope, and the envelopes were passed out in class as part of a "decision making exercise." In the envelope participants also found an instruction sheet that informed them that the enclosed certificate was theirs to keep if they so desired, but that they had an opportunity to potentially double the value of the certificate. To do so, they were going to be assigned to a group of four, and if at least 3 of the 4 group members decided to contribute their own certificate to the community pot, then each

member of that group would get $14.00 worth of certificates (two $7.00 certificates) instead. However, if less than 3 members contributed to the community pot, then no group members would get an additional certificate. In that case, only those members who decided *not* to contribute their certificate to the community pot were entitled to keep the original $7.00 certificate.

Procedure

Participants left their unsealed envelopes and certificates in the classroom and were sent to one of four other classrooms, two of which were computer labs that allowed for e-mail communication and the other two of which were regular classrooms that allowed space for face-to-face meetings. Thus, a total of five classrooms were used for this experiment, all located in the same building.

Participants were then instructed to have a group discussion or meeting with their group members. In the e-mail condition participants were told that their group meeting was to take place exclusively via e-mail, and they were provided with the names and e-mail addresses of the other group members. Similarly, in the face-to-face condition participants were instructed that their group meeting was to be conducted exclusively face-to-face, and were provided with the names of the other parties.

All participants were verbally instructed that no "agreements" during the meeting period were binding because no one had authority over another party and, in addition, contributions to the community pot were to be confidential. In other words, discussion permitted only non-binding solutions to be developed. Participants were told that they had a maximum of 45 minutes to have the group discussion.

Once discussions were completed, participants were allowed back into the primary classroom, where the community pot was located, one at a time to allow for a private decision. While in the privacy of the classroom, participants were instructed to finalize their decisions by sealing their envelopes either with their original certificates (if the decision was to contribute to the community pot) or empty (if they decided to keep the certificates for themselves), and then to return their envelopes to the community pot.

Dependent Variable

Group-Level Cooperation. A group was considered to be cooperative if at least 3 of the 4 members contributed their gift certificate to the benefit of the group, and uncooperative if fewer than 3 group members contributed their certificate to the collective good.

RESULTS AND DISCUSSION

Out of 30 total groups, 14 were cooperative and 16 were uncooperative. In support of Hypothesis 1, groups that communicated online tended to be less cooperative than those that communicated face-to-face. In the online condition 12 out of 14 groups (85.7%) were uncooperative, whereas in the face-to-face condition only 4 out of 16 groups (25%) were uncooperative. To inspect differences between experimental conditions, group cooperation was analyzed categorically – either cooperative or not – with a cross-tabulation. Results suggest that groups in the online condition (relative to those in the face-to-face condition) were significantly less likely to behave cooperatively $\chi^2 (1, N = 30) = 11.06, p < .001$.

Moreover, even if the definition of a cooperative group was "relaxed," the pattern of results remained the same. Specifically, even if we redefined a cooperative group to

include those with only 2 members contributing to the community pot, groups in the online condition were still less likely to cooperate (8 out of 14 groups were uncooperative, or 57.14%) than were those who met face-to-face (3 out of 16 groups were uncooperative, or 18.75%), χ^2 (1, $N = 30$) = 6.45, $p < .05$.

At an individual level, out of 120 participants 55 did not contribute to the collective (45.8%). By condition, this broke down to 64.2% of participants in the e-mail condition and only 30.1% of those in the face-to-face condition.

In this study we demonstrated a basic main effect regarding cooperation in mixed motive group contexts as a function of communication media (e-mail versus face-to-face). However, the precise mechanism underlying the pattern of results remains unclear. Our second study allows us to explore this more directly.

STUDY 2

We propose that feeling a sense of justification to defect from others is likely to vary as a function of communication media. Research on social dilemmas (see Wade-Benzoni et al., 1996a) has shown that most people approach this type of situation with an egocentric interpretation of how much they, individually, are entitled to receive. In addition, research by Diekmann, Samuels, Ross, and Bazerman (1997) has shown that people are more willing to justify an unequal distribution of resources when they received the larger (vs. smaller) share. Building off of this line of research, we argue that e-mail group members may be making more self-serving decisions because these individuals do not possess sufficient reasons to reduce their initial egocentric feelings of entitlement, and thus, will feel more justified in drawing self-serving final decisions – i.e., being uncooperative. In other words, we argue that egocentric interpretations of entitlement

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arise more often on e-mail because the individual is permitted to maintain a "wall" of justification around his or her own needs, and the wall is not broken down the way that it might be through face-to-face contact. As mentioned earlier, e-mail is considered a lean form of communication, whereas face-to-face interaction is considered to have a larger "social bandwidth" (Barry & Fulmer, 2004). Indeed, Kurtzberg et al. (2005) demonstrated that perceptions of justification increased in the online environment—in that case, it was justification for assigning more negative performance appraisals to peers in the online context as opposed to writing them on a piece of paper. E-mail seems to be a psychologically distinct form of communication, and one in which individuals may be more inspired to focus on themselves, quite possibly at the expense of others. Based on this prior evidence, we predict a similar mechanism to operate in this work group context, as follows:

> *Hypothesis 2:* Those group members who use e-mail for their discussion will feel more justified in acting in a self-serving manner.

> *Hypothesis 3:* Feelings of justification will mediate the relationship between mode of communication (i.e., face-to-face vs. e-mail) and the individual's decision to cooperate with the collective or not.

We now turn our attention toward assessing these hypotheses.

Method

Sample and Research Design

Participants were 64 executive-level business students pursuing their MBA degrees on a part-time basis. All participants were employed full-time, and they met on alternating Friday and Saturdays (9 hours each day) to attend classes. The average age of participants was 40.8 years old (S.D. = 6.79). Nineteen percent of participants were female. As with Study 1, participation in this exercise was part of a class assignment.

Participants were randomly assigned to groups consisting of four members. The groups were then randomly assigned to one of two modes of communication, with eight groups interacting via e-mail and eight groups interacting in a face-to-face manner.

Group Task

The group exercise used in this experiment, SHARC (Wade-Benzoni *et al.*, 1996b), presents group members with the task of deciding whether they will cooperate with other group members or not in a simulation based on harvesting shark.[6] In this case, participants represent the interests of various fishing organizations and their cooperation is measured by their harvest decision. All group members share common access to a resource (sharks), which they all harvest for various reasons – some for their livelihood and others for pleasure or sport. There are four roles: large commercial fisher, small commercial fisher, recreational competitive fisher, and recreational tours. In this dilemma, if all members harvest as much as possible, the resource level (shark population) will be depleted. More specifically, the shark population will be depleted if the total harvest levels remain above 2500 metric tons, in which case all members would be worse off than if they had cooperated with each other and reduced their combined harvest to a level below 2500 metric tons. At the start of the exercise the current harvest level is stated at 5000 metric tons with large commercial fisher currently harvesting 1400

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[6] This case can be obtained from the Dispute Resolution Research Center at Northwestern University.

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metric tons, the small commercial fisher harvesting 1300, the recreational competitive

fisher 1200, and the recreational tours harvesting 1100 metric tons, so each player must

decide whether to maintain the current level or change their harvesting activity going

forward. Thus, ideally, the group members must effectively manage the commonly

shared resource (the public good) by cooperating with each other and coordinating their

harvest levels so that the overall harvest for the coming year would be one-half of what it

had been in the past year. The case provides specific payoffs for each role as a function of

both the individual harvest level and the group harvest total such that each role has a

differing incentive to maximize their own profits immediately. The exact payoff schedule

is presented in the Appendix.

It is critical to understand that <u>all parties actually have all the information before

their discussion period</u>, so the discussion is *not* about information exchange. Instead it is

about coming to understand the perspectives of the others and potentially cooperating to

conserve resources for the common good.

Procedure

Participants were instructed to have a group discussion or meeting with their three

other group members. In the e-mail condition participants were told that their group

meeting (i.e., all four members communicating together) was to take place exclusively

via e-mail, and they were provided with the names and e-mail addresses of the other

group members. Similarly, in the face-to-face condition participants were instructed that

their group meeting was to be conducted exclusively face-to-face and were provided with

the names of the other parties and phone numbers by which to arrange a meeting. All

participants were given two weeks to communicate with one another and were explicitly

told in both the written and oral instructions that no "agreements" during the meeting period were binding and that each party was to "check in" with their constituent group before making a final decision. In other words, the discussion permitted non-binding solutions to be developed, but no commitment could be made until after each individual read their final role instructions from their constituents, thus allowing each individual to have complete autonomy from the group during the actual decision process.

After the two-week period, all participants completed their harvesting decision in class on a paper form, after reading their final instructions from their constituents (which in all cases provided no new information), and then filled out several questionnaire items on their sense of justification (see below for details). Before making their harvesting decision, participants were again informed that their decision was to be independent, as no prior agreements were binding. Participants' decisions were made before any discussion of the case took place.

Dependent Variables

Individual Harvest and Cooperation. Participants' harvest decisions in metric tons were recorded. Specifically, participants were asked in an open-ended question to "Please record your harvesting level for the next year in the space provided below." In addition, we calculated the percentage that each participant reduced their harvest from their maximum allowable. Recall that depending on the specific role, the <u>maximum</u> harvest ranged from 1100 to 1400 metric tons, depending on the specific role assigned. Calculating the percentage each participant reduced their harvest from their own maximum harvest level (rather than the absolute harvest level) thus allowed for a better comparison between group members.

Group-Level Cooperation. Because group members engaged in discussion, their outcome decisions might not be independent of each other. For this reason, we also explored the total group harvest level by aggregating the individual harvest levels of all four participants in each group. A reduction of harvest levels to a sustainable shark population, 2500 metric tons, indicated a cooperative group, while those groups that over-harvested (creating an unsustainable resource) were considered uncooperative.

Justification. The level of perceived justification for not cooperating with other group members was assessed by participant's responses to two items that were asked concurrently with the harvest decision. These two questions were aggregated into a single index of perceived justification ($\alpha = .89$). First, justification to be non-cooperative was measured by participants' responses to: "In your specific situation (i.e., your group experience), to what degree do you feel it is appropriate to reduce your harvest level?" (rated on a 7-point scale where 1 = not at all and 7 = very much so). This item was then reverse scored, so that a higher number indicated a greater sense of justification to not cooperate. In addition, participants were also asked the following question just after they had made their harvesting decision: "How justified would it be if you did not cooperate with the other SHARC harvesters? Please give your response on a scale of 1 to 100 with 1 being 'not at all justified' and 100 being 'completely justified'." Responses to this question were transformed onto a scale ranging from 1 to 7, so that both questions would be of equivalent weight in the aggregated justification index measure.

RESULTS AND DISCUSSION

Individual Harvest and Cooperation. Supporting Hypothesis 1, and as summarized in Table 1, those in the online condition ($M = .31$, $SD = .29$) were less

cooperative than those in the face-to-face condition ($M = .46$, $SD = .26$), as measured by the percentage by which each person reduced their harvest, $F(1,62) = 5.07$, $p < .05$, $\eta^2 = .01$.

Group-Level Cooperation. Again in support of Hypothesis 1, relative to those groups that communicated face-to-face ($M = 2748.38$, $SD = 500.21$), groups that communicated online were less cooperative in that they tended to harvest more ($M = 3553.13$, $SD = 526.18$), $F(1, 14) = 9.83$, $p < .01$, $\eta^2 = .41$ (see Table 1).

However, on average, the groups in both conditions failed to reduce their group harvest level below the 2500 metric tons required to sustain the commonly shared resource, although the face-to-face groups were closer, with an average harvest of about 2748 (and a slightly smaller standard deviation). In addition, a greater percentage of groups in the online condition were unable to sustain the commonly shared resource. To illustrate this, group cooperation was analyzed categorically – either cooperative or not – with a cross-tabulation. Results suggest that participants in the online condition (relative to those in the face-to-face condition) were significantly less likely to have a cooperative group, $\chi^2 (1, N = 16) = 7.27$, $p < .01$.

Justification. In Hypothesis 2, we predicted that participants who communicated online would feel more justified being non-cooperative than those who met face-to-face. Analyses here were calculated at the individual level and revealed a significant main effect, supporting our hypothesis. Those in the online condition reported feeling more justification for being non-cooperative ($M = 4.72$, $SD = 2.01$) than did those in the face-to-face condition ($M = 3.39$, $SD = 1.72$), $F(1, 62) = 7.94$, $p < .01$, $\eta^2 = .12$.

The pattern of results remain the same when aggregating individual-level justification to the group-level, $F(1, 14) = 11.69$, $p < .01$, $\eta^2 = .45$.

----Insert Table I about here----

Mediation analysis. To test Hypothesis 3, analyses were performed to explore the potentially mediating role of feelings of justification. Recognizing there are different ways to test mediation, we chose the (widely used) causal mediation analysis set forth by Kenny *et al.* (1998), which includes four distinct steps. The three variables of relevance to the mediation analysis included (1) the communication media (face-to-face or e-mail), (2) the perceived justification to be non-cooperative (the purported mediator), and (3) the percent reduction in harvest. First, a regression analysis demonstrated that the communication media was correlated with harvest decisions, $\beta = -.28$, $t(62) = -2.25$, $p < .05$, thus satisfying the step 1 criterion for mediation.

Next, a regression analysis was conducted using participants' reported perceptions of justification as a criterion variable and the communication media as a predictor. This established a relationship between communication media and purported mediator, $\beta = .34$, $t(62) = 2.82$, $p < .01$, thus satisfying the step 2 criterion.

Next, using harvest reduction as the criterion variable in a regression equation with (a) the communication media and (b) perceived justification as predictors, it was found that perceived justification, the proposed mediator, was correlated with the dependent variable of harvest reduction, $\beta = -.96$, $t(62) = -27.81$, $p < .001$, and remained significant even when controlling for the communication media, $\beta = -.98$, $t(61) = -26.98$, $p < .001$. Thus, the step 3 criterion was met, and feelings of justification were found to

statistically mediate the relationship between the communication media and harvest decisions.

Finally, in step 4, when controlling for perceived justification in this regression equation, the significant relationship between communication media and harvest reduction, $\beta = -.28$, $t(62) = -2.25$, $p < .05$, was reduced to non-significance, $\beta = .06$ $t(61) = 1.53$, ns. Thus, perceived justification was a full mediator in this relationship (rather than a partial mediator).

We also tested whether the indirect effect was significant, the indirect effect being the relationship between the communication media and harvest reduction via perceived justification. Using the Baron and Kenny (1986) modification to the Sobel test, which is distributed as Z, it was demonstrated that this indirect effect was indeed significant, $Z = 2.81$, $p < .01$.

In summary, perceived justification was found to be a mediating mechanism between the communication media and the decision to cooperate with the collective good. Those who communicated via e-mail felt more justified taking more for themselves than those who communicated face-to-face.

This study advances the findings of Study 1 along two fronts. First, the basic finding that individuals tend to be less cooperative in mixed motive groups when they communicate via e-mail (versus face-to-face) was replicated in a distinctly different context. It varied along a number of dimensions beginning with the lack of real (financial or otherwise) consequences for the participants. Additionally, while in Study 1 all participants had an equal say over the final outcome, in Study 2 the social dilemma was asymmetric in that participants brought different resources and incentives to the table.

Finally, another distinction is that in Study 1 the context involved a social dilemma in which participants had to *give* to the collective, whereas in Study 2 the participants had to *take* (i.e., harvest) from the collective good. Yet, in both studies the basic pattern of results remained constant: individuals in groups who interacted in an online environment tended to behave in a more self-serving manner than did those who interacted face-to-face.

Second, this study further established that participants tend to experience an increased sense of justification to be non-cooperative in the online condition. Because we measured perceived justification to be non-cooperative concurrently with the harvest decision it is possible that people rated their feelings about justification to be consistent with their harvest decision. That is, participants may have rated their justification to be non-cooperative as high only after they had already decided to over-harvest as a way to rationalize their intended actions. However, we believe this alternative explanation does not provide a complete account for the observed phenomenon. Recall that groups in *both* experimental conditions were non-cooperative on average in that they both over-harvested, or depleted the shark population beyond the target level, whether they communicated face-to-face or via e-mail.

And because both conditions were over-harvested, if consistency (or rationalization) were driving the effects, we would have expected to see many more individuals seeking to justify these non-cooperative decisions. Instead, not only were those in the online condition systematically higher on average on this scale than were those in the face-to-face condition, but those in the face-to-face condition (on average) rated themselves *below* the midpoint of the scale on this item. Because participants in the

face-to-face condition rate this item in the bottom half of the scale on average, even while making non-cooperative decisions, we have some confidence that consistency is not a complete explanation for our findings. Instead we put forth the conclusion that the communication medium, and the underlying psychological mechanism of feelings of justification, are among the variables driving the observed differences.

GENERAL DISCUSSION

The goal of the present research was to explore *how* and *why* electronic communication, as compared to face-to-face contact, influences cooperation between group members faced with a mixed motive type of task. In general, our basic findings suggest that groups who communicate via e-mail are less likely to contribute to the collective wellbeing and are more likely to focus on the self. Our first experiment documented this effect using real monetary consequences for the participants. Our second experiment replicated this pattern of results and suggested that when using e-mail, an increased sense of justification to not cooperate mediates the decision to act in a more self-serving manner. To our knowledge, this is the first empirical examination of justification in online mixed motive groups.

In a practical sense, knowledge about the potentially negative consequences of using e-mail exclusively for group work in mixed motive contexts is both timely and necessary. In today's competitive organizational environment, groups do not always have the luxury of choosing their communication medium. There may be times in which e-mail is the only available or feasible mode of communication. If this is the case, one might make a strategic effort to overcome the reported hazards of the e-mail context, while still enjoying the benefits that the medium provides. For example, the role of

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managers in organizations may be seen as providing guidance to group members regarding the effective use of communication technology, while monitoring a group's performance (see Hackman & Wageman, 2005; Kirkman *et al.*, 2002). They may perhaps ensure that group members have at least met in a face-to-face context before their groupwork begins. This could help alleviate the relationship-building hardships faced in the entirely virtual context, and break down the sense of justification that appears to exist for people to act in their own best interest. Indeed, many organizations do bring virtual group members together for a "kick-off" meeting face-to-face before they work together electronically.

Most decision making research in the context of virtual groups tends to focus upon the *collective* decisions and not the decisions of *individuals* embedded within the group. The current research addresses this gap, at least in the context of a mixed motive situation or social dilemma, by exploring the individual decisions of group members as a function of communication media. Every person involved in a social dilemma has a similar opportunity to (1) take for oneself or (2) consider the common good and deny oneself immediate reward for the good of the collective. Our results add to the theoretical concept that e-mail communication leads group members to tilt the decision in favor of the self, and one reason for that slant is an increased sense of justification to be non-cooperative.

Yet, we consider our findings regarding justification to be merely the tip of the proverbial iceberg. Even though these results offer some explanation concerning the psychological mechanisms driving this phenomenon, there are other mechanisms that have been shown in previous research that may contribute to the effect, such as feelings

of trust, concerns about fairness, and potentially even concerns about reputation (e.g., Moore et al., 1999; Naquin & Paulson, 2003; Wilson et al., 2006). Exploring the role that these alternative mechanisms have and the interplay among them would be a valuable next step. There are also a number of limitations to our presented research that must be kept in mind. For one, the cross-sectional (and laboratory-based) nature of our data limited our ability to assess the effects of interactions over time. We were also not able to track the specific content of the discussions in either study, and so questions remain about the nature of the discussion itself, the amount of time spent, the amount of information that got exchanged, promises that potentially got made, and perhaps even the global amount of positive or negative relationship that got developed. Future research may be able to focus on these specifics as well as the development of cooperation over time (see Mayer *et al.*, 1995; Wilson et al., 2006). In addition, our research assumed a rather one-dimensional structure of group virtuality - specifically, we only looked at purely virtual vs. purely face-to-face groups. In many organizations, groups may differ in their degree of virtual communication and use some combination of communication media (Martins *et al.*, 2004). Future research may explore such mixed media situations. Similarly, exploration of the cultural boundaries of these findings might be worthwhile. Wade-Benzoni et al. (2002) demonstrated that cultural differences can affect individual cognition and behavior in social dilemma situations. In their study, for example, Japanese decision makers were much more cooperative (even without prior communication with their teammates) than were U.S. participants.

In closing, we wish to point out that, as in many organizational decisions, the pros and cons of how one chooses to communicate must be weighed against one another. The

norms of mode of communication are changing, and written (pen-and-paper) or face-to-face forms of communication are no longer the only options. Electronic media choices have grown notably over the past decade, because they provide a fast and convenient means of communication. Our research contributes to the growing literature suggesting that there are potential hazards to consider when choosing to communicate via e-mail, and these potential hazards should be strategically weighed against their obvious benefits.

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Table I

Means and Standard Deviations for Variables by Experimental Condition in Study 2

| | Experimental Condition | | | | |
| | Face-to-Face | | Online | | |
Variable	M	SD	M	SD	F
1. Individual % Harvest Reduction[1] (i.e., Individual Cooperation)	.46	.26	.31	.29	$(1, 62)$ 5.07**
2. Group Harvest[2]	2748.38	500.21	3553.13	526.18	$(1, 14)$ 9.83**
3. Justification[3]	3.39	1.72	4.72	2.01	$(1, 62)$ 7.94**

[1] Harvest reduction percentage can range from 0 to 1.

[2] Group harvest levels can range from 0 to 5000 metric tons.

[3] Justification can range from 1 to 7.

* $p < .05$

** $p < .01$

*** $p < .001$

Appendix

Payoff Calculations for SHARC Roles

Current Harvest levels in metric tons by role prior to meeting:

1	Large Commercial Harvest =	1400
2	Small Commercial Harvest =	1300
3	Recreational Competitive Harvest =	1200
4	Recreational Tours Harvest =	1100

Payoff Calculations by role after meeting:

1	Large Commercial Payoff =	$10,000 x (Harvest level* + .3(Future))
2	Small Commercial Payoff =	$10,000 x (Harvest level* + .4(Future))
3	Recreational Competitive Payoff =	$10,000 x (Harvest level* + .5(Future))
4	Recreational Tours Payoff =	$10,000 x (Harvest level* + .6(Future))
5	Future =	Smaller of 2,500 or (5000 - total harvest level)
6	* Harvest level =	Harvest level for that particular role