

Online Persuasion: An Examination of Gender Differences in Computer-Mediated Interpersonal Influence

Rosanna E. Guadagno and Robert B. Cialdini
Arizona State University

The purpose of this research was to investigate how computer-mediated communication affects persuasion in dyadic interactions. Two studies compared participants' attitudes after hearing a series of arguments from a same-gender communicator via either e-mail or face-to-face interaction. In Study 1, women showed less message agreement in response to e-mail versus face-to-face messages, whereas men showed no difference between communication modes. Study 2 replicated this finding and examined the impact of prior interaction with the communicator. For women, the condition that provided the least social interaction led to the least message agreement. For men, the condition that provided the most social challenge led to the least message agreement. Results are interpreted in terms of gender differences in interaction style.

A mounting body of evidence indicates that communication modality influences the character and effectiveness of the communication process (see Chaiken & Eagly, 1983, for a review). Although there are many ways in which communication modes differ, one dimension may be particularly relevant to current thinking about interpersonal processes: the extent to which the medium makes prominent (or merely available) various personal and social factors not related to the message itself (Chaiken & Trope, 1999). Communication modalities that restrict the availability of factors such as those mentioned above may be referred to as socially constrained, whereas those that provide access to such cues may be termed socially unconstrained.

We argue that this dimension extends from written, entirely text-based modes (e.g., essays, e-mail, newspaper articles) on the socially constrained side, to voice-based modes (e.g., radio or intercom transmissions), through visually based modes (e.g., televised or videotaped presentations), and finally to face-to-face interactions (e.g., workplace meetings, corridor conversations) on the socially unconstrained pole.

It is noteworthy that social psychological research on persuasion has rarely examined either computer-mediated or face-to-face interaction, preferring to use other modalities for reasons of methodological control and ease. One goal of the present research was to redress this disparity by assessing the impact of persuasive appeals delivered in the ecologically frequent but grossly understudied contexts of face-to-face and computer-mediated exchanges.

According to dual-processing models of persuasion (Chaiken, 1980; Chaiken & Trope, 1999; Petty & Cacioppo, 1984), circumstances that direct the attention of communication recipients toward or away from features of the message can have decidedly different persuasive consequences. Thus, socially constrained and unconstrained communication modes may produce different persuasion patterns among individuals focused differentially on message-related or interpersonal aspects of the communication setting.

For example, Chaiken and Eagly (1976) examined how mode of communication affected message processing as well as subsequent attitudes. In their study, participants received either a difficult or an easy to comprehend persuasive message through one of three communication modalities: videotape, audiotape, or written. The easy message was more effective in the videotape condition, the socially unconstrained communication modality in which the speaker's cues were most salient. Conversely, the difficult

Rosanna E. Guadagno and Robert B. Cialdini, Department of Psychology, Arizona State University.

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Correspondence concerning this article should be addressed to Rosanna E. Guadagno, Department of Psychology, Arizona State University, Box 1104, Tempe, Arizona 85287-1104. E-mail: rosanna@asu.edu

message was more effective in the written communication condition, the socially constrained mode in which source cues were minimized. This study provided clear evidence that different types of persuasive messages produce differential degrees of attitude change as a function of communication medium.

Chaiken and Eagly (1983) conducted a follow-up study in which they manipulated likability of the communicator. As in the initial study, participants received a persuasive message through one of three communication modalities. However, in this case, participants also read a personal statement from the speaker that made him sound likable or unlikable. When the speaker was likable, participants in both videotape and audiotape conditions evidenced greater attitude change than participants in the written communication condition. When the speaker was not likable, attitude change was greatest for participants who received the written communication. These results suggest that in the videotape and audiotape conditions (the less socially constrained conditions), the personal cues of the communicator were salient and participants engaged in heuristic processing of the persuasive message. Conversely, in the written communication condition, in which source cues were less salient, participants processed the message systematically.

Similarly, Morley and Stephenson (1977) conducted a series of studies that investigated the influence of formality of communication system on negotiation. These studies primarily investigated the persuasive factors involved in a two-person negotiation that took place either over the phone or face-to-face. According to our terminology, because nonverbal feedback (e.g., eye contact, body language, facial expression) was not available to participants in the phone condition, the phone condition was more socially constrained than the face-to-face condition. In each negotiation, one participant was given a strong case (i.e., a large number of high-quality arguments) whereas the other was given a weak case to argue. The overall results of this series of studies indicated that, as predicted, the strong case was more successful in the (more socially constrained) phone condition than in the (less socially constrained) face-to-face condition. Conversely, the weak case argument was more successful in the face-to-face condition than in the phone condition. A clear

implication of these results is that social constraint of the communication modality has an impact on the persuasive factors at work in a negotiation process (Morley & Stephenson, 1977). With more social cues available, the research participants were less swayed on the quality of their opponent's position.

In sum, the results of the previously reviewed studies (Chaiken & Eagly, 1976, 1983; Morley & Stephenson, 1977) suggest that the persuasive impact of different types of messages is moderated by the extent to which the communication modality makes salient message-relevant versus non-message-relevant (e.g., social) cues.

Computer-Mediated Communication: A New Communication Mode

More recently, a newer communication modality has emerged—computer-mediated communication (CMC)—which stands to become increasingly important as a medium for communication. A recent survey reported that 71 million people in the United States have access to the Internet (Iconocast, 1999), and the numbers are increasing. People use the Internet to send e-mail, participate in real-time interactive group discussions, download software, participate in noninteractive discussion (e.g., Usenet), use a remote computer, conduct business transactions, and engage in real-time audio or video conversations (Jones, 1995).

To date, CMC has been highly socially constrained, restricted for the most part to text-based, impersonal forms. Therefore, we would expect that persuasive messages delivered in this fashion would produce response patterns similar to those of other socially constrained communication modalities.

And in fact, such patterns were found in the research of Kiesler, her colleagues, and others in studies of group decision making (Dubrovsky, Kiesler, & Sethna, 1991; Hiltz, Johnson, & Turoff, 1986; Kiesler, Siegel, & McGuire, 1984; Siegel, Dubrovsky, Kiesler, & McGuire, 1986). These investigators found that compared with face-to-face participants in decision groups, individuals communicating through a computer were more likely to violate social norms of politeness and to be focused more uniformly on the task. Similarly, a study by Matheson and Zanna (1989) on face-to-face

versus CMC persuasion revealed a direct link between social cues and attitude change only in the face-to-face condition. Several studies have additionally reported that participants interacting via face-to-face like their discussion partners more than those interacting via CMC (Kiesler, Zubrow, Moses, & Geller, 1985; Weisband & Atwater, 1999). Additionally, these measures of partner liking were predictive of decisions in face-to-face interaction but not in CMC. As with the previously reviewed studies on communication modality, it appears that individuals who communicate through this socially constrained mode are less focused on their partners and more focused on the assigned task.

Gender Differences in Persuasion

Social roles, especially gender-based roles, are another factor that can influence responses to persuasion attempts. In a meta-analysis of 148 studies, Eagly and Carli (1981) found a tendency for women to be more persuadable than men, but this effect was moderated by the extent to which social factors, such as group pressures and publicness of response, were present. Eagly (1987) and others (Tannen, 1990; Wood & Stagner, 1994) attribute these findings to different social role expectations for men and women. Men are said to be oriented toward agency, which often manifests in attempts to demonstrate one's independence from others in successful performances. Women, on the other hand, are said to be more communally oriented, which often manifests in activities designed to foster interpersonal cooperation and relationship formation and maintenance.

According to linguist Deborah Tannen (1990), men's communication style in interpersonal interaction is based on the perception that in interactions, a man must strive to achieve independence and avoid failure. Women, on the other hand, have a slightly different perception of their world. This perspective is one in which conversations are meant to achieve closeness and consensus. Thus, according to Tannen's view, when interacting with others, men are interested in establishing independence through assertiveness or mastery of their environment, whereas women are interested in making connections with other individuals through cooperation.

Overview of the Present Experiments

As more and more people gain access to the Internet, a greater amount of interpersonal communication is taking place through this medium. Moreover, an increasing number of business decisions are being made primarily through text-based messaging, such as e-mail. The purpose of these experiments was to examine (a) the ways in which this relatively new and very socially constrained communication modality influences the process of a persuasive appeal and (b) the impact that this modality has on male versus female message recipients, who tend to focus differentially on the interpersonal aspects of an exchange.

Study 1

The purpose of our first study was to examine the way a communicator could persuade a discussion partner to favorably evaluate a counter-attitudinal message, depending on strength of argument, communication modality, and gender of the target of persuasion. In our design, a confederate attempted to induce agreement in a same-gender research participant on the merits of instituting comprehensive exams as a new graduation requirement. The confederate was interviewed by each research participant using one of two communication modality conditions: e-mail or face-to-face. During the course of the interview, the confederate used either a strong or a weak set of arguments in favor of the proposal in an attempt to persuade the research participant.

A novel aspect of this paradigm was the use of a confederate to administer the persuasive arguments in an interactive exchange rather than having research participants read a written message on a computer screen or watch a videotaped message. This allowed us to investigate the impact of persuasive messages in a bilateral exchange context rather than in a unilateral persuasion agent-to-persuasion target context, which is typical of persuasion research but might not be representative of the way persuasion is accomplished in many nonexperimental settings.

Given that men and women differ in their motivational goals, we expected that women in the face-to-face condition would express more agreement with the confederate than would

women in the e-mail condition because the social constraint of e-mail does not easily allow for the establishment of a connection or bond. For men, however, we expected communication mode not to make as much of a difference in evaluation of the persuasive message because men are more likely to enter interactions with a desire for independence rather than cooperation or bonding. Because communicator characteristics matter more for women and are more salient in face-to-face interactions, we also predicted that personality trait ratings of the confederate would be related to attitude toward the comprehensive exams only among women in the face-to-face condition.

We also predicted that across communication mode and gender, strong arguments would elicit more message agreement than weak arguments. Finally, because e-mail is a highly socially constrained communication mode, we expected that participants in this condition would generate more message-oriented cognitive responses to the persuasive interaction. Conversely, because face-to-face interaction is a socially unconstrained communication mode, we expected participants to be more focused on the communicator and therefore to record more communicator-focused thoughts than participants in the email conditions.

Method

Participants

Research participants were 159 (80 female, 79 male) undergraduate psychology students.¹ Only those with computer experience were eligible for this study.

Design

The experimental design was a 2 (communication mode: face-to-face vs. e-mail) \times 2 (argument strength: strong vs. weak) \times 2 (gender of dyad: male vs. female) factorial.² From evidence that most undergraduates would not support the institution of senior comprehensive exams,³ the confederate was instructed to present either a set of strong or weak arguments (adapted from Petty, Harkins, & Williams, 1980)⁴ in an attempt to change the participant's attitude.

Procedure

On arrival, research participants were informed that they were to take part in a two-person interview–discussion and opinion survey on behalf of the university administration. They were told that they would be paired with a partner (the confederate) with whom they would discuss the merits of instituting senior comprehensive exams as an additional graduation requirement and that this discussion would be structured like an interview. One partner was assigned the task of “interviewing” the other partner (always the confederate). At this point, participants were given an informational paragraph describing the comprehensive exam proposal and the goal of the interview discussion.

Next, participants were given a personal statement handwritten by the confederate. All participants read the same statement from the confederate, which included information such as his or her year in school, favorite food, and hobbies and an indistinct description of his or her personality. This information was provided to create a uniform initial impression of the confederate.

Prior to engaging in the interview–discussion, participants in the e-mail condition received training on how to use the computer

¹ An additional set of participants were run but excluded from the analyses: 12 expressed suspicion, 5 did not understand the task, and 4 failed the relevance manipulation check. Analyses of the primary dependent measures with these participants included in the data set did not yield different results than reported.

² Personal relevance (high vs. low) was also manipulated, but it did not yield any significant effects on the primary dependent measures. Thus, this variable is not discussed further. However, relevance was still included in all the analyses reported here for appropriate partitioning of the variance.

³ Pretesting of the introductory psychology subject pool indicated the mean favorability rating of this issue was 3.14 on a scale ranging from 1 (*extremely unfavor*) to 9 (*extremely favor*).

⁴ The arguments used in this study were adapted from Petty, Harkins, and Williams (1980). Examples of the strong arguments emitted by the confederate are as follows: “The quality of teaching is better at schools with exams” and “Average starting salaries are higher for graduates for schools with exams.” Examples of the weak arguments are as follows: “Companies that develop these exams wouldn’t market to schools unless they worked” and “Graduate students have to take comprehensive exams and if undergrads don’t have to, that’s discrimination.”

program.⁵ All participants were given a list of questions to ask their discussion partner. Once participants were prepared, they were introduced to the confederate and the interview–discussion began.

For each question, the confederate was prepared to emit a scripted response that contained an assigned (strong or weak) argument. The confederate was instructed that during the interview–discussion he or she should discuss only the comprehensive exam proposal and provide only statements based on the assigned set of arguments. However, the confederate was told that if the participant went off-task, he or she should try to reveal only information consistent with the information on the personal statement or to state additional opinions on the comprehensive exams that were consistent with the arguments and overall cover story. At the end of the interview–discussion, each participant completed the dependent measures. Next, a suspicion check was conducted, and the participant was debriefed and excused.

Dependent Variables

The main measure was participants' attitude toward the comprehensive exam proposal, measured using a scale ranging from 1 (*extremely un* _____) to 9 (*extremely* _____) on the following dimensions: workable, valuable, needed, and favorable.

Next, participants' cognitive responses to the interview–discussion were measured using a thought-listing exercise. Finally, a series of additional measures assessed participants' impression of the confederate on a scale ranging from 1 (*not at all* _____) to 9 (*very* _____) on the 13 different dimensions.

Results

Attitude Measure

Participants' ratings of the comprehensive exam proposal on the attitude measures were averaged to form one composite of overall attitude toward the exam proposal ($\alpha = .92$). A 2 (face-to-face vs. e-mail) \times 2 (strong vs. weak argument) \times 2 (male vs. female dyad) analysis of variance (ANOVA) revealed two significant effects. The first was a main effect for argument strength, $F(1, 143) = 6.64, p = .01, \eta^2 = .044$.

Participants in the strong argument condition rated the comprehensive exam more favorably ($M = 5.56$) than participants in the weak argument condition ($M = 4.76$).

As depicted in Table 1, there was also a significant communication mode by gender interaction, $F(1, 143) = 6.58, p = .01, \eta^2 = .044$. A test of simple effects indicated that this interaction was due to the fact that women in the face-to-face condition ($M = 5.54$) were more favorable toward comprehensive exams than women in the e-mail condition ($M = 4.68$), $F(1, 156) = 3.87, p = .05$, whereas men showed a nonsignificant trend, $F(1, 156) = 2.47, p = .12$, in the opposite direction.

Partner Ratings

A principal-axis factor analysis with oblique rotation was conducted on the partner trait ratings. This analysis indicated that the 13 traits on which the confederate was rated could be reduced to form three distinct factors. Factor 1, labeled "Congenial," accounted for 49% of the variance and contained the following traits: approachable, confident, likable, interesting, friendly, sincere, and warm. Factor 2, labeled "Knowledgeable," accounted for 7% of the variance and contained the following traits: competent, informed, and credible. Finally, Factor 3, labeled "Sincerity," accounted for 6% of the variance and contained the following traits: modest, honest, and trustworthy. The factor loadings for Congenial ranged from .573 to .879; for Knowledgeable, from .737 to .804; and for Sincerity, from .323 to .851.

A 2 (face-to-face vs. e-mail) \times 2 (strong vs. weak argument) \times 2 (male vs. female dyad) ANOVA on the Knowledgeable composite revealed a significant main effect for argument strength, $F(1, 143) = 20.82, p < .01, \eta^2 = .127$, indicating that participants perceived the confederates emitting the strong arguments as more knowledgeable ($M = 7.35$) than confederates emitting the weak arguments ($M = 6.34$). Similar ANOVAs on the Congenial and Sincerity composites revealed no significant differences by condition.

⁵ Both the participant's and the confederate's names appeared on the screen, creating a nonanonymous CMC environment.

Table 1
*Mean Attitude Toward the Comprehensive Exam
 (and Standard Deviations)*

Dyad and attitude	Communication mode	
	Face-to-face	E-mail
	Study 1	
Female	5.54 (1.85)	4.68 (2.10)
Male	4.86 (1.99)	4.68 (1.99)
	Study 2	
Female		
Competitive	5.33 (1.90)	5.27 (2.10)
Independent	5.52 (2.06)	4.25 (2.08)
Cooperative	5.21 (0.99)	5.09 (1.64)
Male		
Competitive	4.08 (1.95)	5.57 (1.85)
Independent	6.12 (1.47)	5.89 (1.78)
Cooperative	5.57 (1.42)	5.50 (1.26)

Correlation coefficients between the partner evaluation composites and the attitude measure indicated that partner trait ratings were significantly related to attitude in only one condition. For women in the face-to-face condition, attitude was significantly positively correlated with all three factors (for Congenial, $r = .406$, $p = .01$; for Knowledgeable, $r = .448$, $p = .01$; and for Sincerity, $r = .317$, $p = .05$). For women in the e-mail condition and for men in both communication modalities, there were no significant correlations between partner trait ratings and attitude.

Cognitive Responses

Two independent judges who were blind to experimental condition rated participants' cognitive responses as recorded on the thought listing measure for valence (positive, negative, or neutral) as well as focus (communicator, message, or irrelevant). The judges' ratings were averaged to form a more reliable measure.⁶

Communicator thoughts. Communicator thoughts refer to any comments about the confederate that were recorded by participants on the thought-listing measure. A 2 (face-to-face vs. e-mail) \times 2 (strong vs. weak argument) \times 2 (male vs. female dyad) ANOVA on the total number of communicator thoughts recorded by participants indicated that participants in the face-to-face condition recorded more communi-

cator thoughts ($M = 2.02$) than participants in the e-mail condition ($M = 1.44$), $F(1, 143) = 4.83$, $p = .03$, $\eta^2 = .033$. This analysis revealed an additional significant main effect for argument strength, indicating that participants in the weak argument condition ($M = 2.01$) recorded more communicator thoughts than participants in the strong argument condition ($M = 1.45$), $F(1, 143) = 4.38$, $p = .04$, $\eta^2 = .03$.

Message thoughts. Message thoughts refer to any comments about the comprehensive exams and the arguments emitted by the confederate. A 2 (face-to-face vs. e-mail) \times 2 (strong vs. weak argument) \times 2 (male vs. female dyad) ANOVA on the total number of message thoughts recorded by participants did not reveal any significant effects. However, an examination of the negative message thoughts revealed a significant main effect for communication mode. Participants in the e-mail condition recorded relatively more negative message thoughts ($M = 1.12$) than participants in the face-to-face condition ($M = 0.83$), $F(1, 143) = 3.98$, $p = .05$, $\eta^2 = .027$.

Unscripted Comments

The interview–discussion transcripts were content coded.⁷ The total number of unscripted comments emitted by participants in each session was counted. A 2 (face-to-face vs. e-mail) \times 2 (strong vs. weak argument) \times 2 (male vs. female dyad) ANOVA on the total number of unscripted comments revealed a significant main effect for communication mode, indicating that participants in the face-to-face condition were more likely to deviate from the scripted questions ($M = 6.91$) than were participants in the e-mail condition ($M = 1.38$), $F(1, 132) = 35.74$, $p = .01$, $\eta^2 = .213$. This analysis also revealed a main effect for gender, indicating that men were more likely to deviate from the scripted questions ($M = 5.49$) than

⁶ The interrater reliabilities for each type of cognitive response were as follows: for total, $r = .88$; communicator, $r = .99$; positive communicator, $r = .87$; negative communicator, $r = .48$; message, $r = .73$; positive message, $r = .78$; negative message, $r = .73$; irrelevant, $r = .67$. Note that the lower correlation coefficients occurred in cells in which there was a restricted range of responses.

⁷ Eleven transcripts (10 face-to-face, 1 e-mail) were lost through a recording error.

women ($M = 2.55$), $F(1, 132) = 10.38$, $p = .01$, $\eta^2 = .073$. These two main effects were qualified by a significant two-way communication mode by gender interaction, $F(1, 132) = 3.92$, $p = .05$, $\eta^2 = .029$. A test of the simple effects indicated that for participants in the face-to-face condition, men were more likely to make unscripted comments ($M = 9.29$) than were women ($M = 4.54$), $F(1, 145) = 9.29$, $p = .01$. However, in the e-mail condition, there was no significant gender difference in number of unscripted comments.

Discussion

This study provides new information on the impact of strength of argument, participant gender, and communication mode on interpersonal influence. Our results suggest that the most effective way to persuade an individual differs according to the strength of the argument as well as his or her gender and the mode of communication.

A number of conclusions can be drawn. First, in this study, as in previous research (see Petty & Cacioppo, 1986), the strength of the argument had a significant impact on agreement with the message, indicating that strong argumentation is more persuasive than weak argumentation. Additionally, participants were more focused on the communicator in the weak argument condition as compared with the strong argument condition, as indicated by the finding that participants in the weak argument condition recorded more communicator thoughts than did participants in the strong argument condition.

As predicted, participants in the face-to-face condition recorded more communicator thoughts than did participants in the e-mail condition, suggesting that source cues were more salient in the face-to-face condition than in the e-mail condition. In addition, more negative message thoughts were generated in the e-mail condition as compared with the face-to-face condition, suggesting a greater message focus in the e-mail condition as compared with the face-to-face condition. The fact that the communication mode difference occurred only for negative message thoughts suggests that e-mail participants may have responded to the message with counter argumentation that was suppressed for those in face-to-face interactions.

Perhaps the most intriguing finding in this study is that men and women differed in message-favorable attitudes depending on which communication mode they used to interact with the same-gender confederate. Specifically, women in the face-to-face condition reported more agreement than did women in the e-mail condition. However, there was no significant difference between men in the e-mail and men in the face-to-face condition. These findings do not appear to be due to a tendency for women to be more persuadable than men, as the women never exhibited significantly higher levels of agreement than men in comparable conditions.

We believe that participants responded in a manner consistent with gender-stereotypical expectations. For men, there was no difference in agreement with the message between e-mail and face-to-face perhaps because the differences in social constraint between the two conditions were relatively unimportant to the men, whose social roles focus more on independence and agency than on relationships. We believe that women, on the other hand, whose roles focused them more on relationship formation and cooperation, aligned their attitudes more with the persuader's position in the face-to-face condition because it was in that condition that their relationship goals were salient and attainable. This interpretation receives support from the strong positive correlations between attitude toward the exams and persuader personality trait ratings that occurred only for women in the face-to-face condition.⁸

An alternative explanation of these results is that male and female confederates differed in their persuasiveness and that these differences led participants to evaluate the arguments differently. To explore this possibility, a pair of raters coded the e-mail transcripts for persuasiveness. All references to participant gender were removed. An analysis of these data revealed no significant gender differences. However, a main effect for argument strength was revealed, as in the attitude measure, $F(1, 74) = 153.60$, $p < .01$, $\eta^2 = 1.0$.

⁸ The previous research that reported greater liking in face-to-face interactions as compared with e-mail did not include a detailed breakdown of the means by gender composition of the dyad, so it is difficult to compare these results with the previous findings.

Finally, although the interview–discussion transcripts were coded only for the quantity of unscripted comments, in informal observations during this coding we noted that when the men in face-to-face conditions went off script, they seemed to be attempting to establish dominance, whereas women who went off script tended to do more bonding. This observation is similar to an analysis of gender differences in the content of Internet newsgroup postings conducted by Herring (1993) and greatly influenced the design of Study 2.

Study 2

We conducted a second study to (a) replicate the gender by communication mode interaction of Study 1 (so as to increase confidence in its reliability) and (b) modify the pattern through additional manipulations designed to shed light on the conceptual mediation on this basic effect. That is, if it is the case that men are more likely to see their interactions with others in terms of competition whereas women are more likely to see such interactions in terms of cooperation (Eagly, 1987; Tannen, 1990), we wondered whether it would be possible to influence male and female responses to a communicator by varying the nature of their prior (competitive or cooperative) interaction. In the socially unconstrained environment of face-to-face communication, men who have had a prior competitive interaction with the communicator should respond competitively by rejecting the communicator's argument. This should not be the case for women, however, for whom prior interaction may serve to establish a relationship in which cooperation and harmony are sought. Thus, for women, it might be the case that various forms of prior interaction would set the stage for future agreement with the other by way of relationship-building attempts. For women, then, it would not be a competitive prior interaction that would lead to rejection of a communicator's argument but rather a lack of meaningful prior interaction.

To examine these possibilities, we used the face-to-face and e-mail procedures of Study 1 to replicate the basic finding of that study (that women showed less message agreement in e-mail versus face-to-face modes, whereas men's levels of agreement did not differ) when we provided participants with no meaningful prior

interaction. In addition, we gave some participants a competitive experience with the communicator before the persuasion attempt, and we gave other participants a cooperative experience with the communicator before the persuasion attempt.

According to a social roles perspective, one would expect a prior competitive interaction to have the most negative effect on the men and that this would be the case primarily in the face-to-face communication mode, where social and personal cues are prominent. By this same account, however, one would expect the most negative effect on the women's levels of message agreement to occur when there had been the least amount of prior interaction and that this would be the case primarily in the e-mail condition, where social and personal cues are most prominent.

Method

Participants

Research participants were 237 (139 female, 98 male) undergraduate psychology students selected in the same way as in Study 1.⁹

Design

The experimental design was a 2 (communication mode: face-to-face vs. e-mail) \times 2 (gender: male vs. female dyad) \times 3 (prior interaction: competitive vs. cooperative vs. independent) factorial. The confederate was instructed to present the set of strong arguments used in Study 1.

Procedure

Participants were told that they would participate in two separate studies, one examining the way individuals put together numbers and one providing feedback on proposed changes to academic policy.

As in the previous study, the participant and the confederate arrived at the same place and time. This time, however, the experimenter

⁹ An additional 20 participants were excluded from the data analyses because they expressed suspicion. Analyses of the primary dependent measures with these participants included did not yield different results.

brought both participant and confederate to the same lab room at the same time.

The experimenter then proceeded to present instructions for the first study, a number game that was designed to manipulate prior interaction. There were three versions of the game: one designed to induce competition, one designed to induce cooperation, and one that provided equivalent interpersonal exposure without any explicit cooperative or competitive interaction.

All participants were presented with the same introductory statement and were told that they would take turns building their own puzzle using three-sided dominos. The instructions then deviated depending on condition.

Participants in the competitive prior interaction condition were told that the purpose of this study was to compare the performance of introductory psychology students with that of education students (such as the confederate).¹⁰ They were each instructed to take turns playing a piece, then take a piece from the other's pile of pieces. Confederates were instructed to try to take pieces that the participants were likely to use. Finally, participants in this condition were told that the person who performed the best would receive a \$25 prize. The prize was offered to strengthen the competitive environment and to motivate participants to attend to the task.

Participants in the cooperative prior interaction condition were told that the purpose of this study was to examine the performance of introductory psychology students partnered with education students. They were each instructed to take turns playing a piece and then offer a piece to their partner. Confederates were instructed to try to offer pieces to the participants that they could use. Finally, participants in this condition were told that the pair who performed the best would receive a joint \$25 prize. In this case, the prize was offered to strengthen the cooperative environment and to motivate participants to attend to the task.

Participants in the independent prior interaction condition received only the introductory statement and were then instructed to take turns playing without exchanging any pieces. They were also told that the best performing introductory psychology participant would win a \$25 prize, as would the best performing education student. The prize was offered to motivate

participants to attend to the task at the same level as participants in the other conditions.

All participants were given a sheet to track their performance. Participants were told that this tracking sheet would be used to compute their performance scores. Finally, the experimenter set a timer for 5 min and left the confederate and participant alone in the room to play the game.

Once the timer rang, the experimenter reentered the room and transitioned to the discussion of the comprehensive exam. The experimenter explained that the participant and confederate would discuss a potential change to academic policy. The participant was asked to pick out of an envelope one of four possible topics. The confederate was asked to pick out of an envelope one of two possible roles: the interviewer (the one who asks the questions) or the respondent (the one who answers the questions). In reality, each envelope contained multiple copies of the same choice: comprehensive exam for the topic of discussion and respondent as the role for the confederate. After these assignments were made, the experimenter moved the participant to a room with a computer and the rest of the experiment replicated the procedure from Study 1.

Dependent Variables

Attitude toward the comprehensive exam, cognitive responses, and partner trait ratings were assessed using the same measures as in Study 1.

As manipulation checks for the nature of the prior interaction (game check), participants were asked three questions. First, they were asked to rate the nature of the number-matching game on a Likert-type scale ranging from 1 (*cooperative*) to 9 (*competitive*) with 5 (*neither competitive or cooperative*) as the scale midpoint. Next, participants assessed their partner's competitiveness and cooperativeness using a Likert-type scale ranging from 1 = *not at all* ____ to 9 = *very* ____.

To assess computer experience, we asked participants to indicate the number of hours

¹⁰ The confederate was also introduced as an education student in Study 1. This was done to reduce suspicion due to the fact that two participants arrived for an experiment for which only one was scheduled.

spent using a computer and the Internet for multiple purposes.

Predictions

We predicted that the communication mode by participant gender interaction reported in Study 1 would be replicated in the independent prior interaction conditions in this study. Specifically, we expected the women in the independent prior interaction, e-mail condition to show less message agreement than women in the face-to-face conditions. In addition, we expected to find no communication mode difference between men across conditions.

The general social role prediction for men was that there would be no communication mode or prior interaction difference in agreement toward the message except in the face-to-face, competitive prior interaction condition. In this condition, we expected less message agreement than in the other male conditions, resulting in a 1 versus 5 pattern of results.

For women, the general social role prediction was for a different 1 versus 5 pattern of results. Because motivation for cooperation and bonding should override the competitive nature of the prior interaction, we expected women to report more message agreement in all conditions in which some type of interaction occurred. Thus, we predicted a 1 versus 5 pattern of results, with women in the e-mail, independent prior interaction condition showing less message agreement as compared with all other conditions.

Finally, we did not expect to find any gender differences in computer experience among our participants.

Results

Manipulation Checks

Game check. A 2 (face-to-face vs. e-mail) \times 2 (male vs. female dyad) \times 3 (competitive vs. cooperative vs. independent prior interaction) ANOVA revealed a significant main effect for prior interaction condition, indicating that participants perceived the competitive game condition ($M = 6.16$) as more competitive than the independent ($M = 5.52$) and the cooperative ($M = 3.00$) conditions and that the independent condition was seen as more competitive than the

cooperative condition, $F(1, 225) = 52.01, p < .01, \eta^2 = .316$. This analysis also indicated that men viewed the game as more competitive than did women ($M = 5.32$ vs. $M = 4.93$), $F(1, 225) = 10.84, p < .01, \eta^2 = .046$.

Competitive trait rating. A 2 (face-to-face vs. e-mail) \times 2 (male vs. female dyad) \times 3 (competitive vs. cooperative vs. independent prior interaction) ANOVA revealed a significant main effect for prior interaction condition, indicating that participants perceived their partners in the competitive ($M = 5.47$) and independent ($M = 5.52$) prior interaction conditions as more competitive than those in the cooperative prior interaction condition ($M = 4.78$), $F(1, 225) = 4.80, p < .01, \eta^2 = .041$. In addition, this analysis revealed a significant main effect for participant gender, indicating that men perceived their partners as more competitive than did women ($M = 5.32$ vs. $M = 4.93$), $F(1, 225) = 11.55, p < .01, \eta^2 = .049$.

Cooperative trait rating. A 2 (face-to-face vs. e-mail) \times 2 (male vs. female dyad) \times 3 (competitive vs. cooperative vs. independent prior interaction) ANOVA revealed a significant main effect for participant gender, indicating that across all conditions, female confederates were rated as more cooperative than male confederates ($M = 8.33$ vs. $M = 7.82$), $F(1, 225) = 9.41, p < .01, \eta^2 = .04$. Thus, analyses of these three manipulation checks indicated that the situation and the confederate were perceived accurately in each condition. In addition, men perceived the confederate and situation as more competitive than did women.

Attitude Measure

The reliability of the attitude composite was $\alpha = .91$.¹¹ The 2 (face-to-face vs. e-mail) \times 2 (male vs. female dyad) \times 3 (competitive vs. cooperative vs. independent prior interaction) ANOVA yielded a significant two-way interaction between communication mode and prior interaction, $F(1, 225) = 3.54, p = .03, \eta^2 =$

¹¹ Prior attitudes toward the comprehensive exam proposal were available for 181 participants (76% of the sample). An analysis of covariance on the attitude measure using the pretest attitude as the covariate revealed the same pattern of results as without the covariate. Consequently, data on the full sample without the covariance analysis are reported hereafter.

.031; a significant two-way interaction between prior interaction and gender, $F(1, 225) = 4.14$, $p = .02$, $\eta^2 = .036$; and a marginal two-way communication mode by gender interaction, $F(1, 225) = 3.05$, $p = .08$, $\eta^2 = .013$. See Table 1 for a breakdown of means by condition.

In addition, we conducted a more focused set of analyses relative to our specific predictions. Our first major prediction was that the communication mode by gender interaction of Study 1 would be replicated in the independent interaction condition of Study 2. An analysis of the independent prior interaction cells revealed a nearly significant interaction of communication mode and participant gender, $F(1, 235) = 3.57$, $p = .06$. Simple effects tests indicated that, as in Study 1, women in the e-mail condition reported less agreement than women in the face-to-face condition ($M = 4.25$ vs. $M = 5.52$), $F(1, 234) = 6.49$, $p = .01$. For the men in the independent condition, the difference between e-mail and face-to-face was not significant, $F(1, 234) = 0.01$, *ns*. Thus, the results of Study 1 were replicated.

The second major prediction was that message agreement would not differ among men except for those in the competitive prior interaction, face-to-face condition, which should show the least agreement. A 1 versus 5 contrast testing this hypothesis proved significant, $F(1, 225) = 11.65$, $p < .01$. An additional examination of the attitude measure for men across condition revealed that in addition to the above results, there was no communication mode difference between men within the cooperative condition, $F(1, 225) = 0.008$, *ns*, or in the independent condition, $F(1, 225) = 0.17$, *ns*. For men in the competitive condition, however, there was less agreement in the face-to-face condition as compared with men in the e-mail condition ($M = 4.08$ vs. $M = 5.57$), $F(1, 225) = 5.91$, $p = .02$. Thus, for men, the type of interaction did not have an impact on agreement unless they were initially forced to compete, then later placed in a face-to-face interaction where their prior competitor espoused his views.

For women, a different picture emerged in keeping with the third major prediction. The least agreement occurred among those in the independent prior interaction condition. The difference in attitude toward the exams between e-mail and face-to-face was not significant if the

prior interaction was cooperative *or* competitive, $F(1, 225) = 0.032$ and $F(1, 225) = 0.019$, respectively. The hypothesized 1 versus 5 contrast between the independent, face-to-face condition and all other female conditions was significant, $F(1, 225) = 6.94$, $p = .01$. Thus, for women, the absence of any type of prior interaction minimized their willingness to agree with their discussion partner. See Table 1 for a presentation of the means for this measure.

Partner Ratings

The partner trait ratings were analyzed using a confirmatory factor analysis to test whether the factors established by the exploratory factor analysis in Study 1 generalized to this sample. The model fit reasonably well, CFI = .928, $\chi^2(1, N = 62) = 161.34$, $p < .01$.

Congenial. A 2 (face-to-face vs. e-mail) \times 2 (male vs. female dyad) \times 3 (competitive vs. cooperative vs. independent prior interaction) ANOVA revealed a significant main effect for gender, indicating that women rated the confederate as more congenial than did men ($M = 7.03$ vs. $M = 6.30$), $F(1, 225) = 21.57$, $p < .01$, $\eta^2 = .087$.

In addition, women in the independent, e-mail condition rated their discussion partner as less likable than did women in any other condition, $F(1, 225) = 10.53$, $p < .01$. Thus, the same 1 versus 5 pattern that appeared in the attitude measure also appeared in ratings of partner congeniality. For men, there were no differences in partner ratings by condition.

Knowledgeable. A 2 (face-to-face vs. e-mail) \times 2 (male vs. female dyad) \times 3 (competitive vs. cooperative vs. independent prior interaction) ANOVA revealed a significant main effect for gender, indicating that women rated the confederate as more knowledgeable than did men ($M = 7.50$ vs. $M = 6.95$), $F(1, 225) = 6.27$, $p = .01$, $\eta^2 = .027$.

Sincerity. A 2 (face-to-face vs. e-mail) \times 2 (male vs. female dyad) \times 3 (competitive vs. cooperative vs. independent prior interaction) ANOVA revealed a significant main effect for gender, indicating that women rated the confederate as more sincere than did men ($M = 7.50$ vs. $M = 6.95$), $F(1, 225) = 16.21$, $p < .01$, $\eta^2 = .067$.

In addition, women in the independent, e-mail condition rated their discussion partner as

less sincere than did women in any other condition, $F(1, 225) = 7.03, p = .01$. Thus, the same 1 versus 5 pattern that appeared in the attitude measure also appeared in ratings of partner sincerity. For men, there were no differences in partner ratings by condition.

Finally, an examination of the correlations between attitude toward the comprehensive exams and communicator trait ratings did not reveal any significant differences by condition, contrary to the results reported in Study 1.

Cognitive Responses

An analysis of the message and communicator thoughts did not reveal the communication mode differences found in Study 1—that face-to-face interaction produced more communicator thoughts than did CMC interaction, $F(1, 225) = 0.14, ns$. This suggests that the prior interaction eliminated the differences in message processing typically found in the persuasion literature.

An examination on the positive communicator thoughts showed that women in the independent, e-mail condition recorded fewer positive thoughts about their discussion partner than did women in any other condition, $F(1, 225) = 6.94, p = .01$. Thus, the same 1 versus 5 pattern that appeared in the attitude measure also appeared in ratings of positive thoughts about their partner. For men, there were no differences in positive communicator thoughts by condition.

Computer Experience

The items on the computer experience measure were summed to form one composite ($\alpha = .68$). An ANOVA on this measure revealed no significant effects for gender, communication mode, or prior interaction. Thus, it appears that the gender differences in persuasion cannot be explained by gender differences in computer use.

Discussion

The results of this study replicated the finding in Study 1 that without a prior meaningful interaction, women taking part in a persuasive exchange via e-mail agreed with a communicator less than women taking part in the same exchange in a face-to-face setting. In addition, we demonstrated that this result was not due to gender differences in computer experience. In-

stead this difference looks to be associated with gender differences in interaction style: women are motivated to form bonds, whereas men are motivated to compete if necessary to achieve independence. The finding that women reported the same level of message agreement in all conditions involving prior interaction with the confederate, even when this prior interaction was competitive in nature, bolsters this interpretation. This interpretation is additionally supported by the predicted 1 versus 5 pattern wherein women in the e-mail, independent condition reported lower ratings on attitude toward the comprehensive exam, partner congeniality, partner sincerity, and positive thoughts about the partner as compared with women in the other conditions. It is not surprising that women chose to bond rather than compete, in that women feel more comfortable cooperating, even in a competitive environment (Anderson & Morrow, 1995). Additionally, women will choose to bond with other women, especially in times of stress (Taylor et al., 2000). Finally, previous research on gender-stereotypical behavior indicates that women will reject imposed roles if they do not agree with them (Cialdini, Wosinska, Dabul, Whetstone-Dion, & Heszen, 1998).

Men, on the other hand, did not appear to be focused on establishing a cooperative bond with the confederate. Instead, they evaluated the arguments for what they were and showed no differences in attitude toward the exams unless they had competed previously, and then took part in the face-to-face discussion with the prior rival. Although men showed no universal tendency for competition, it appears that they can be pushed to compete and that the competitive, face-to-face condition spurred them to do so, decreasing their willingness to align their attitudes with their competitor.

General Discussion

Taken together, these two studies shed light on the impact of interactive CMC on interpersonal influence. For women, having any prior interaction with a communicator enhances the level of agreement relative to that occurring in impersonal e-mail interactions. For men, only an intensely competitive environment led to less agreement.

However, certain unanswered questions remain and deserve further investigation. First, it

is possible that the communication mode difference in message processing typically found in the persuasive communication literature (that face-to-face interaction produces more communicator-relevant thoughts than CMC interaction) may extend only to short-term interactions with strangers. The fact that there was no difference in cognitive responses in Study 2 suggests that a prior relationship with the communicator superseded the communication mode. In addition, Walther and Burgoon (1992) found that modality effects in impression formation were eliminated after a group interacted via CMC over an extended period of time. Thus, in situations where an individual attempts to persuade a person he or she knows, there may be no difference in the amount of systematic or heuristic processing. Future research should examine this phenomenon in real-world settings.¹²

It is additionally possible that women in the face-to-face conditions agreed more with the persuasive message because it facilitated bonding and a comfortable interaction environment. It would be interesting to test the duration of their attitude toward the exams. If their reported opinions were just a function of public conformity, then we would expect that their agreement with the message would fade faster over time than it would for men.

Finally, it is possible that our results may hold true only for same-gender pairings. Same-gender pairs were used in the present research to reduce additional error variance that may have occurred as the result of mixed-gender pairings. Our results might not replicate as strongly in other contexts such as a mixed-gender situation, because mixed-gender pairs display less gender-stereotypical behavior than do same-gender pairs (Carli, 1989; Deaux & Major, 1987) and evaluate each other differently (see Kiesler et al., 1985). Future research on this phenomenon should be conducted on mixed-gender dyads.

¹² In addition, these results may not generalize to contexts in which the CMC is completely anonymous. Research indicates that in-group identity becomes more salient when the CMC is anonymous (see Postmes, Spears, & Lea, 1998, for a review). Social identities such as gender become more salient and may serve as a heuristic cue and may lead to more agreement with in-group members and less agreement with out-group members. However, because participants in this study were not anonymous, an increased salience of social categories was not an important feature of the CMC environment we created.

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