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Gender Interaction Patterns and Gender Participation in Computer-Supported Collaborative Argumentation

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This case study examined interaction patterns between men and women and the effects of the patterns on gender participation in online debates. Students labeled messages to identify each message as an argument, challenge, evidence, or explanation when posting messages to the debates. The results revealed no differences in the number of male and female challenges elicited by male versus female messages, number of male and female rebuttals (e.g., explanations and counterchallenges) elicited by male versus female challenges, and the frequency of challenges and explanations posted by men versus women. These findings suggest that gender differences in communication styles do not necessarily produce gender differences in response patterns and participation. Other factors such as male–female ratio and task structures can affect gender interaction patterns and gender participation. Nevertheless, this study demonstrated how interaction patterns can provide causal explanations for observed differences and similarities in male and female performance in computer-mediated environments.

A growing body of research has been conducted on gender differences in computer-mediated communication (CMC) to examine the relationships between gender and participation in CMC. The significance of this research continues to grow with the increased use of networked computers in education and the workplace. With the increased use of CMC is the assumption that CMC reduces the gender-influenced inequalities often observed in face-to-face communication by diminishing the salience of physical and social cues that reveal the gender of participants (Wojahn 1994). As a result, CMC is believed to enable both men and women to openly share, confront,

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and discuss differing viewpoints to engage in deeper discussions and critical discourse (Johnson and Johnson 1992) and, ultimately, to enable men and women to participate equally in online group discussions.

Despite these claims, however, studies show clear gender differences in communication style. Men tend to assert opinions strongly as facts, place more value on presenting information, are more likely to use crude language and violate rules of conduct, and engage in more adversarial exchanges (Blum 1999; Fahy 2002a, 2000b; Herring 1993, 1999; Mahoney and Knupfer 1997; Savicki, Lingenfelter, and Kelley 1996). By contrast, women tend to hedge, qualify, and justify their assertions; express support for others; make apologies; manifest a more consensus-making orientation; and are more likely to challenge participants who violate rules of conduct (Fahy 2003; Smith, McLaughlin, and Osborne 1997). In addition, women who engage in confrontational exchanges are often negatively perceived by others as dominating, bossy, or emotional (Butler and Geis 1990). As a result, women perceive that contributions that are confrontational are less accepted by others (Flanagin et al. 2002). Furthermore, participants have been found to modify their communication styles in the direction of the majority gender (Baym 1996; Herring 1996).

These differences in communication style can potentially affect how men and women exchange messages (Jeong 2006). To identify patterns in the exchange of messages between men and women in asynchronous threaded discussions, a previous case study (Jeong and Davidson-Shivers, in press) examined gender interactions that occurred in computer-supported collaborative argumentation (CSCA). In this study, students were restricted to a prescribed set of functional categories (arguments, supporting evidence, challenges, explanations) when posting messages to group discussions, were required to classify each message by category, and were required to insert a message label into the subject headings of messages to identify each message by function. This approach has been implemented in a number of CSCA systems to facilitate argumentation and problem solving (Carr and Anderson 2001; Cho and Jonassen 2002; Jeong and Juong in press; McAlister 2003; Veerman, Andriessen, and Kanselaar 1999). An additional benefit of using this approach is that all messages and responses can be accurately categorized and analyzed for patterns in message–response sequences.

Data from this study showed that women were just as likely as men to challenge both men and women, and women responded to men with challenges at a higher-than-expected frequency. However, men posted more rebuttals to both male and female challenges, whereas women posted fewer rebuttals

than men to female challenges. No differences were found in the frequency of arguments, supporting evidence, challenges, and explanations posted by men versus women. Furthermore, three patterns of interaction between genders were found to occur at significantly higher-than-expected frequencies—men posting critical replies to male critiques, men posting explanations in response to previous explanations, and men posting supporting evidence in response to female arguments. However, these findings are not conclusive, because they were based on the performance of one group of participants in one online course, the participants were mostly male, and the women may have modified their communication style in the direction of the majority gender (Baym 1996; Herring 1996). As a result, additional study is needed to further examine patterns in male and female exchanges and to examine how particular patterns affect gender participation in CSCA.

Theoretical Framework

The rationale for analyzing messages and responses exchanged between genders was based on two assumptions of the dialogic theory of language (Bakhtin 1981; Koschmann 1999): (a) conflict and meaning is produced not by the message itself but by examining the relationship between opposing viewpoints presented in messages and responses to messages; and (b) conflict drives the processes of inquiry, the articulation of viewpoints and underlying assumptions, and the construction of shared meaning and understanding (Johnson and Johnson 1992; Baker, 1999; Wiley and Voss 1999). As a result, a process-oriented approach (Dillenbourg et al. 1996) was used in this study to examine the functional relationship between messages and the responses elicited by the messages exchanged between genders and by examining the exchanges that produce conflict.

Instructional Context

To identify interaction patterns between men and women, this study examined male and female exchanges produced in online group debates and CSCA. Argumentation engages students in the use of transactive reasoning (including justification, criticism, elaboration, clarification, and elaboration of ideas) to test out uncertainties, to extract meaning, and to achieve deeper understanding (McAlister 2001). It is also used to investigate and evaluate evidence and alternative arguments (Kruger 1993). Argumentation is a task that has clearly established processes and discourse structures (Toulmin 1958), which narrows the scope of analysis to specific sequences

of speech acts believed to support critical discourse and significantly facilitates the process of operationalizing and measuring interaction in terms of message–response frequencies.

Purpose of Study

The purpose of this case study was to examine interaction patterns between men and women and the effects of gender interaction patterns on gender participation in CSCA. Based on previous studies that show men to be more likely than women to engage in argumentative exchanges, this study tested five hypotheses:

1. Male messages elicit more challenges from men than women.
2. Female messages elicit more challenges from men than women.
3. Male and female challenges elicit more personal rebuttals (e.g., counterchallenges and explanations) from men than women.
4. Men post more challenges as a result of the predicted interaction patterns.
5. Men post more explanations as a result of the predicted interaction patterns.

Method

Participants

The participants ($n = 31$) were graduate students from a major university in the southeast region of the United States enrolled in an online introductory course to distance education. The participants consisted of nine women and six men in the fall semester, and ten women and six men in the same course taught in the following spring semester. The gender of each student was determined at the beginning of the course through personal introductions. All students in the course consented to participating in this study.

Debate Procedures

Using the same online course and procedures reported in the previous study (Jeong and Davidson-Shivers 2006), the students participated in eight online debates (five debates in the fall term, three debates in the spring term) with asynchronous threaded discussion boards in Blackboard, a Web-based course-management system. Students received 20% of their

course grade based on their participation in the online debates and discussions and were required to post a minimum of four messages per debate. They were randomly assigned to one of two teams (balanced by gender) to defend their position and were required to vote for the team that presented the strongest arguments after each debate.

The purpose of each debate was to critically examine key issues in distance learning covered during the week of the debate. For example, students debated over the following claims: "the Dick & Carey ISD [Instructional Systems Design] model is an effective model for designing the instructional materials for this course," "the role of the instructor should change when teaching at a distance," "type of media does not make any significant contribution to student learning," and "live chats are more effective tools for online group discussions than asynchronous threaded discussions."

Students were presented four message categories (see Figure 1) before each debate based on Toulmin's (1958) model of argumentation. Students were required to classify each posted message by category by inserting the corresponding label into the subject headings of each message (see Figure 2) and to restrict the content of each message to address only one category

Label	Description of label	Example message by label
+	Identifies a message posted by a student assigned to the team *supporting* the given claim/statement	--
-	Identifies a message posted by a student assigned to the team *opposing* the given claim/statement	--
ARG#	Identifies a message that presents *one and only one* argument or reason for using or not using chats instead of threaded discussion forums). Number each posted argument by counting the number of arguments already presented by your team. Sub-arguments need not be numbered. ARG = "argument".	**-ARG1** One's choice of media makes very little difference in students' learning because the primary factor that determines level of learning is one's choice of instructional method.
EXPL	Identifies a reply/message that provides additional support, explanation, clarification, elaboration of an argument or challenge.	**-EXPL** As a result, media are merely vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition.
BUT	Identifies a reply/message that questions or challenges the merits, logic, relevancy, validity, accuracy or plausibility of a presented argument (ARG) or challenge BUT).	**+BUT** However, one's choice of media can affect or determine which instructional methods are or are not used. If that is the case, then choice of media can make a significant difference.
EVID	Identifies a reply/message that provides proof or evidence to establish the validity of an argument or challenge.	**-EVID** Media studies, regardless of the media employed, tend to result in "no significant different" conclusions (Mielke 1968)

Figure 1. Example Instructions on How to Label Messages During the Online Debates

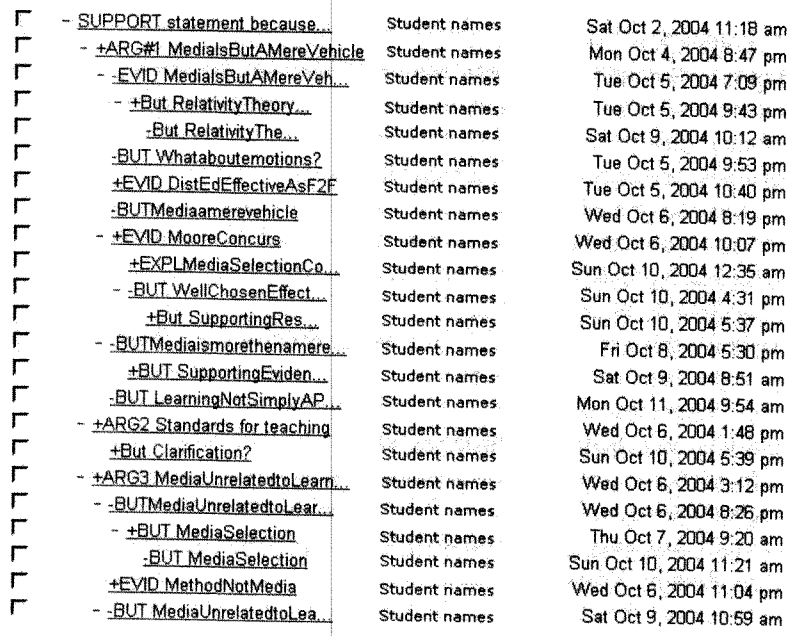

Figure 2. Example of Online Debate With Labeled Messages in an Asynchronous Threaded Discussion Forum

at a time. During each debate, students were instructed to return to previous messages to insert any labels that were omitted from message headings. In each debate, separate discussion threads were designated for posting supporting and opposing arguments.

Message labels were used to establish each message as the unit of analysis so that message–response sequences could be clearly identified to determine their relative frequencies. Without these procedures, messages often address multiple functions at the same time, making the process of mapping the functional relationship between messages and responses extremely difficult to accomplish at a high level of accuracy (Gunawardena, Lowe, and Anderson 1997).

Data Analysis

Computer software was developed to download the Blackboard discussions into Microsoft Excel and to harvest the message labels from message headings. Gender was determined by referring to student names displayed

with each message posted in the discussions (see Figure 2). A total of 781 messages was generated from the eight debates (see Figure 3). Two debates (one from each course) were randomly selected and coded by the experimenter to test for errors in students' labels. The Cohen kappa was $r = .86$ with a 91% agreement. Finally, each of the five hypotheses examined in this study was tested against the Bonferroni adjusted alpha value of $p = .05/5 = .01$.

Results

Responding to Messages With Challenges

The results did not support the hypothesis that male messages are more likely to elicit challenges from men than from women. In the mean number of male versus female challenges elicited per male message, men ($M = 6.42$, $SD = 2.84$, $n = 12$) did not differ significantly from women ($M = 6.11$, $SD = 3.60$, $n = 19$), $t(29) = .25$, $p = .80$, effect size = .10. The women were just as likely as men to challenge men.

The findings did not support the hypothesis that female messages are more likely to elicit challenges from men than from women. In the mean number male versus female challenges elicited per female message, men ($M = 7.75$, $SD = 3.14$, $n = 12$) did not differ significantly from women ($M = 6.21$, $SD = 3.24$, $n = 19$), $t(29) = 1.30$, $p = .20$, effect size = .48. As a result, the women were just as likely as men to challenge the claims of women.

Responding to Challenges With Personal Rebuttals

No significant gender differences were found in the mean number of personal rebuttals posted in response to challenges (see Table 1). The mean number of male rebuttals elicited per male challenge was .23 ($SD = .43$, $n = 77$), the mean number of male rebuttals elicited per female challenge was .22 ($SD = .44$, $n = 118$), the mean number of female rebuttals elicited per male challenge was .18 ($SD = .41$, $n = 93$), and the mean number of female rebuttals elicited per female challenge was .20 ($SD = .40$, $n = 122$). The one-way analysis of variance yielded no significant differences between the four means, $F(3, 406) = .31$, $p = .81$. Table 2 shows the post hoc comparisons of the mean number of personal rebuttals between each of four possible gender exchanges.

Frequency Matrix

	ARGf	BUTf	EVIDf	EXPLf	ARGm	BUTm	EVIDm	EXPLm	Replies	No Replies	Givens	% targets	% givens
ARGf	3	58	24	14	0	45	9	6	159	29	105	.39	.13
BUTf	0	44	14	11	0	32	2	10	113	145	240	.39	.31
EVIDf	0	14	5	5	0	11	2	1	38	47	76	.12	.10
EXPLf	0	6	2	1	0	5	0	0	14	34	48	.08	.06
ARGm	0	40	20	7	0	27	15	17	126	9	70	.00	.09
BUTm	0	59	8	5	0	34	3	2	111	81	170	.28	.22
EVIDm	0	4	2	1	0	7	0	1	15	22	34	.06	.04
EXPLm	0	15	0	4	0	9	3	1	32	13	38	.06	.05
	3	240	75	48	1E-04	170	34	38	608	380	781	608	781

Transitional Probability Matrix

	ARGf	BUTf	EVIDf	EXPLf	ARGm	BUTm	EVIDm	EXPLm	Replies	No Replies	Givens	Reply Rate
ARGf	.02	.36	.15	.09	.00	.28	.06	.04	159	29	105	.72
BUTf	.00	.39	.12	.10	.00	.28	.02	.09	113	145	240	.40
EVIDf	.00	.37	.13	.13	.00	.29	.05	.03	38	47	76	.38
EXPLf	.00	.43	.14	.07	.00	.36	.00	.00	14	34	48	.29
ARGm	.00	.32	.16	.06	.00	.21	.12	.13	126	9	70	.87
BUTm	.00	.53	.07	.05	.00	.31	.03	.02	111	81	170	.52
EVIDm	.00	.27	.13	.07	.00	.47	.00	.07	15	22	34	.35
EXPLm	.00	.47	.00	.12	.00	.28	.09	.03	32	13	38	.66
	3	240	75	48	0	170	34	38	608	380	781	.35

Z-score Matrix

	ARGf	BUTf	EVIDf	EXPLf	ARGm	BUTm	EVIDm	EXPLm
ARGf	**2.92**	-0.90	1.23	0.50	-0.01	0.11	0.04	-1.50
BUTf	-0.83	-0.13	0.02	0.80	0.00	0.09	-1.96	1.27
EVIDf	-0.45	-0.34	0.16	1.24	0.00	0.14	-0.09	-0.95
EXPLf	-0.27	0.26	0.22	-0.11	0.00	0.65	-0.92	-0.98
ARGm	-0.89	-1.99	1.36	-1.09	-0.01	-1.83	**3.46**	**3.77**
BUTm	-0.82	**3.26**	-1.82	-1.47	0.00	0.69	-1.47	-2.14
EVIDm	-0.28	-1.03	0.12	-0.18	0.00	1.63	-0.95	0.07
EXPLm	-0.41	0.88	-2.18	0.99	0.00	0.02	0.96	-0.75

ARG = argument, BUT= challenge, EVID = evidence, EXPL = explanation. Replies = replies posted to each message type; No Replies = messages that received no replies; Givens = number of messages observed; Reply Rate = percentage of messages that elicited at least one reply. The numbers presented in bold font and underlined were significantly greater than the expected probability 1/12 categories = .083) based on *z*-score tests with $p < .01$.

Figure 3. Transitional Probability Matrix Produced by the Discussion Analysis Tool

Table 1. Mean Number of Personal Rebuttals Posted by Males and Females in Reply to Male and Female Challenges

	Current Study				Previous Study[a]			
Gender Exchange	***M***	***SD***	**Rebuts**	**Challenges**	***M***	***SD***	**Rebuts**	**Challenges**
Male→Male	.23	.43	18	77	.32	.47	11	34
Male→Female	.22	.44	20	118	.28	.46	5	18
Female→Male	.18	.41	19	93	.38	.49	9	24
Female→Female	.20	.40	24	122	.08	.28	1	13
Total	—	—	81	410	—	—	26	89

[a]Jeong and Davidson-Shivers (2006).

Table 2. Post Hoc Comparison of Mean Number of Personal Rebuttals to Challenges Between Each of the Four Possible Gender Exchanges

				Current Study		Previous Study	
Contrasts	***t* Value**	***d.f.***	***p***	**Differ**	**Effect Size**	**Differ**	**Effect Size**
mm vs. mf	.28	168	.78	.09	.04	.16	.10
mm vs. ff	.62	192	.54	.19	.09	4.21	.63
mm vs. fm	.92	193	.36	.31	.13	−.16	−.11
mf vs. ff	.32	213	.75	.09	.04	3.61	.53
mf vs. fm	.64	209	.53	.21	.09	−.26	−.20
ff vs. fm	.36	238	.72	.11	.05	− 4.88	−.74

Note: mm = personal male rebuttal to a male challenge; mf = personal female rebuttal to a male challenge; ff = personal female rebuttal to a female challenge; fm = personal male rebuttal to a female challenge.

Number of Challenges and Explanations Posted by Men Versus Women

The results shown in Table 3 revealed no significant differences in the mean number of challenges posted per man ($M = 14.42$, $SD = 5.16$, $n = 12$) versus per woman ($M = 12.42$, $SD = 5.89$, $n = 19$), $t(29) = .96$, $p = .34$ with effect size of .45.

No significant differences were found in the mean number of explanations posted per man ($M = 3.33$, $SD = 2.39$, $n = 12$) versus per woman ($M = 2.58$, $SD = 2.50$, $n = 19$), $t(29) = .83$, $p = .41$ with effect size of .32.

Post hoc analysis also revealed no significant differences in the mean number of arguments posted per man ($M = 5.92$, $SD = 3.45$, $n = 12$) versus per woman ($M = 5.11$, $SD = 3.43$, $n = 19$), $t(29) = .64$, $p = .52$ with effect

Table 3. Mean Number of Postings by Gender Across Message Categories

	Response Category				
Gender	**ARG**	**BUT**	**EVID**	**EXPL**	***Overall***
Female					
M	5.11	12.42	3.95	2.58	24.05
SD	3.43	5.89	2.48	2.50	7.39
n	19	19	19	19	19
Male					
M	5.92	14.42	2.83	3.33	26.50
SD	3.45	5.16	3.95	2.39	8.47
n	12	12	12	12	12
Effect size	.265	.455	–.347	.326	.372

Note: ARG = argument; BUT = challenge; EVID = evidence; EXPL = explanation.

size of .26, and no significant differences in the mean number of supporting evidence posted per man ($M = 2.83$, $SD = 3.95$, $n = 12$) versus per woman ($M = 3.95$, $SD = 2.48$, $n = 19$), $t(29) = -.97$, $p = .34$ with effect size of –.34.

Exploratory Analysis of Interaction Patterns Between Genders

Sequential analysis was used to identify prevalent patterns in the way each gender responded to messages from men versus women and how particular patterns affected gender participation (Bakeman and Gottman 1997). A transitional probability matrix (see Figure 3) was produced using the Discussion Analysis Tool (Jeong 2003) to reveal (a) how often given types of messages posted by a particular gender elicited particular types of responses posted by a particular gender in terms of the observed frequencies and their relative frequencies (or transitional probabilities) and (b) whether the observed probabilities were higher or lower than the expected probabilities based on a random distribution of responses across each message category and *z* score tests (see Bakeman and Gottman 1997, 108–111).

The transitional probability matrix revealed three main patterns in the exchanges between genders. Male challenges elicited a higher-than-expected frequency of female counterchallenges relative to all the observed responses to male challenges (59% of all responses to male challenges) even when percentage wise there were more opportunities to post counterchallenges to female challenges ($n = 240$) than male challenges ($n = 170$). Male arguments elicited a higher-than-expected frequency of responses with supporting evidence and responses with supporting explanations. The two transitional state diagrams in Figure 4 provide a graphical Gestalt view of the three patterns observed in the female and male responses to messages posted by men and provides insights into other potential differences in the way the messages of men elicit responses from other men compared with women.

Discussion

The purpose of this case study was to examine gender interaction patterns and their effects on gender participation in CSCA. The findings in this study, although not conclusive, did not support any of the predicted interaction patterns between genders based on the findings of previous studies that show men to be more likely than women to engage in argumentative exchanges (Herring 1993; Tannen 1994). No gender differences were found in the frequency of male and female challenges elicited by *male* messages, the frequency of male and female challenges elicited by *female* messages, the frequency of personal rebuttals posted by men in response to male and female challenges, and the frequency of challenges and explanations posted between men and women.

Although male and female messages were not found to elicit more challenges from men than women, these two findings were consistent with the

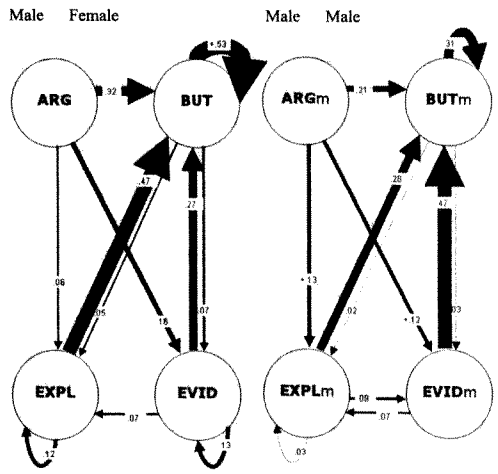

Figure 4. Transitional State Diagrams Produced by the Discussion Analysis Tool

results of the previous study (Jeong and Davidson-Shivers 2006). Like the previous study, the procedures used to support argumentation were likely the main factors that contributed to the observed similarities in response patterns. In other words, the use of a debate format, message constraints, and message labels may have been sufficient to motivate the participants, particularly the female participants, to challenge the claims of both men and women. Another possible contributing factor was that the men may have modified their communication styles in the direction of the female majority, and, hence, the men were less likely to challenge either male or female messages.

The finding that male and female challenges did not elicit more rebuttals from men than women not only failed to support this study's predictions but also was not consistent with findings from the previous case study. For example, the mean number of male rebuttals elicited per female challenge was not significantly different from the mean number of female rebuttals elicited by female challenges in this study, but it was significantly higher in the previous study. One explanation for this difference in finding is the possibility that the men in this study modified their communication styles to match the style of the *female* majority (post fewer challenges in response to messages and fewer rebuttals to challenges), whereas in the previous study, the female participants modified their communication style in the direction of the *male* majority but only when posting challenges in response to messages (which initiates an argument) and not when posting rebuttals to challenges (which prolongs an argument and can increase the potential for interpersonal conflict). Another reason for the finding is that the men in this study exhibited a higher-than-expected tendency to post supporting evidence and explanations in response to male arguments as opposed to posting rebuttals in response to male challenges (which was observed in the previous study), combined with the observed tendency of women to respond to male challenges with counterchallenges.

Given these possible scenarios surrounding the patterns of interaction between genders, the quality of argumentation could be improved by considering the following strategies. To increase the number of female rebuttals to challenges (and to promote deeper reflection through self-explanation), create mixed gender groups whenever possible. When the majority of participants are women, require participants to post a set minimum number of rebuttals per debate or train participants to express disagreements using appropriate language that encourages continued exchanges and contributes to group maintenance. For example, challenges can be made to appear less harsh or grating by initially acknowledging a participant's point and following the acknowledgment with one's counterpoint. In general, encourage participants to use more conversational language (not expository language, which is often a common characteristic of formal arguments) to help elicit more reciprocal exchanges (Jeong 2006).

Finally, the observed patterns of interaction between genders helped to explain why in this study no significant differences were found in the mean number of challenges and explanations posted per man versus woman. No significant differences were found in the mean number of challenges posted between genders because male and female messages were just as likely to elicit a challenge from men compared with women. No significant differences were found in the mean number of explanations posted between genders, partly because male and female challenges were just as likely to elicit rebuttals (which include explanations) from men compared with women. What is important here is that the analysis of response patterns between genders—specifically, how often one type of message elicits a given type of response—helped to provide process-oriented or causal explanations for gender differences in frequencies of messages posted across message categories.

Overall, this study provides insights into some of the complex nuances of group interaction in online discussions and insights into how gender can affect the processes of critical discourse. However, the findings are not conclusive because of a number of limitations in this study. Future research will need to incorporate larger student samples, control for male–female ratios, examine multiple and possibly smaller groups, replicate the findings across multiple domains, and test for gender differences across collaborative as well as adversarial exchanges (e.g., ARG→EVID, ARG→ELAB). Most of all, future studies will need to control for the effects of different strategies (with or without message labeling) used to facilitate discourse to determine (a) to what extent each strategy, when used alone, produces patterns of interaction that facilitate critical discourse and (b) how particular patterns ultimately affect group decision making, problem solving, and learning.

Nevertheless, these findings suggest that differences in male and female communication styles do not necessarily translate into specific patterns of interactions between genders to produce gender differences in participation in CSCA. Other factors such as variations in male–female ratio and choice of methods used to structure discourse can play a significant role in moderating the way men and women interact and participate in CSCA. When these factors affect the way men and women interact and how the resulting patterns of interactions affect level of discourse are additional questions for future research. We hope that the theoretical

framework, method, and tools demonstrated in this study will help lay the groundwork for advancing research on factors affecting group interaction and group performance in CSCA and ultimately in computer-mediated environments.

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Gender Salience and the Use of Linguistic Qualifiers and Intensifiers in Online Course Discussions

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Past studies of online discourse found social presence to be a critical element in the learning process. Social presence connotes the extent to which students perceive themselves as intellectually connected to the other participants in an online dialogue. Impediments to the development of social presence can disrupt knowledge formation as a group activity. This study analyzed differences in the language styles of men and women as one such impediment. When students self-categorize by gender, the expository speaking style of men may crowd out the epistolary style of women, leading women to cognitively disengage from the group learning process. However, in online course environments, where self-categorization is by shared identity, such crowding out is less likely to occur. This study found no evidence of a male crowding-out effect.

Social presence is critical to knowledge building in online discourse. Social presence is the way a person perceives another person in an online interaction and the consequent recognition of the interpersonal relationship. Richardson and Swan (2003) defined social presence as the degree of salience of a person in a mediated interaction. Salience is the extent to which a person is perceived as being an actual participant in an online conversation or, in the present context, the way in which participants project their personalities as well as ideas into online discussions through textual and linguistic means. For example, Fahy (2002) and Reid, Keerie, and Palomares (2003) associated tentative language with a low degree of saliency. Richardson and Swan found that students reporting higher perceived social presence also reported that they learned more and gained greater satisfaction from

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