INTERPERSONAL AND AFFECTIVE COMMUNICATION IN SYNCHRONOUS ONLINE DISCOURSE[1]

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This article examines the communication of text-based synchronous online discussion (chat) participants during the process of information sharing. It addresses the communicational constraints imposed by the computer-mediated communication (CMC) channel on participants' expression of interpersonal and affective stances, analyzes the mechanisms participants employed to overcome these constraints, and describes the characteristics of information seeking in chat interaction. Data for this study are derived from a math help chat group for K–12 students, facilitated by the Virtual Math Teams at Drexel University. Participants employed a variety of creative linguistic and paralinguistic devices to express interpersonal and affective stances, such as contractions of linguistic forms, prosodic features, and typographical conventions such as capital letters and emoticons to simulate gesture and facial expressions. The analysis of data suggests that effective interpersonal and emotional communication is a critical factor in enhancing group involvement and collaboration as well as information service in a CMC context.

Introduction

Owing to the rapid development of communication technologies, there has been rapid growth in multiple genres of social interaction through computer-mediated communication (CMC). Existing and emergent CMC genres include e-mail, discussion lists, newsgroups, chat, digital reference, instant messaging, multiuser dimensions (MUD), Web blogs, and computer-supported collaborative learning (CSCL) [1–3]. Studies of language

use indicate that CMC employs a high degree of interpersonally oriented language. This can be explained by the characteristics of the population of online communities, principal among which is a mutual interest or concern. This characteristic is clearly manifested in CMC genres that require either subscription or a user name and password for participation. Communication based on shared interest and common ground facilitates highly interactive communication patterns. For instance, text-based synchronous online discussion (chat) forums display a high degree of interpersonal and interactional involvement among participants.

Face-to-face communication makes use of a number of communicational features that facilitate an efficient process for encoding and decoding linguistic and paralinguistic features that convey interpersonal and affective feelings among participants [1, 4–6]. Paralinguistic features are supralinguistic features that are added to linguistic elements. In other words, prosodic features such as high pitch, intonation, pause, and accent, together with nonverbal signals such as gesture and facial expressions, function to convey interpersonal and affective feelings, as well as to modify semantic meanings that the linguistic elements deliver to the hearer.

Users of CMC lack these contextual cues. Typing requires more effort and time than speaking and thus delays the transference of a communicator's message. In contrast to a face-to-face setting, text-based CMC affords neither the speaker nor the hearer opportunities for communicating meanings through kinesic cues such as gesture and facial expression or through vocal qualities such as intonation and accent. The text-based asynchronous communication channel does, however, afford the speaker time for reflecting on the message before transferring it to the hearer, and it does allow both the speaker and the hearer to preserve and revisit the messages that they exchange with each other. These characteristics of CMC are similar to written language rather than spoken language, and they enrich the depth and quality of asynchronous online discussion forums such as discussion lists, e-mails, and online discussion threads; accordingly, they engender knowledge building among participants through group collaboration [7–9].

In the case of the text-based, real-time synchronous channel, spontaneous interaction among participants is nearly analogous to that of spoken language [10–11]. Rapid feedback is possible, and online group participants develop rapport by signaling their understanding or misunderstanding through back channel mechanisms that include linguistic and paralinguistic elements. Such rapid feedback enhances social presence among group participants and impels the building of social cohesion.

The goal of this article is to examine how chat participants in an educational context interact and communicate during the process of infor-

mation seeking and sharing for group-oriented knowledge building. Toward this end, this article will examine the following research questions from a linguistic perspective:

1. What constraints are imposed by the computer-mediated communication channel on language users?

2. Which linguistic and paralinguistic mechanisms do online participants employ to communicate interpersonal and affective stances in presenting their thoughts and arguments?

3. How can information behavior be characterized in synchronous online interaction?

Theoretical Background

A variety of linguistic perspectives and approaches have been used to study the features of *discourse*, defined as a linguistic unit beyond the sentence. Interactional sociolinguistics examines how language is situated in particular culture and society and concerns the language of sociocultural interaction [12]. Ethnography of speaking examines the following fundamental questions: "What does a speaker need to know in order to communicate appropriately and to make sense of communicative situations within a particular speech community, and how does he or she learn this?" [13, p. 351]. Pragmatics examines language use as action in social context. Discourse analysis in all of these approaches focuses on both speech and textual modes of language use in socioculturally situated contexts.

The macro functions of language can be categorized into two groups: (1) transaction of information and (2) interpersonal and interactional communication. These functions are primarily mixed in written and spoken language use, even though there are differences in degree [14]. For example, in the case of direction and task-oriented discourse, such as emergency call conversation, a doctor's direction to a nurse for patient treatment, or nonspontaneous courtroom discourse, the transactional function of language use is dominant. Conversely, in everyday language use, the interactional function holds sway. These differences can be observed in the realization of linguistic forms.

For instance, a text that is high in transactional function presents high lexical density with certain types of linguistic forms such as nouns, attributive adjectives, prepositional phrases, and longer words. Such linguistic forms are utilized to convey high information density within a text. By contrast, interactional and interpersonally oriented texts present a high use of interpersonal markers, such as first- and second-person pronouns, contractions, discourse markers (such as "well," "I see," "oh," "yes," "you

know," "kinda," and "sort of"), upgraders (e.g., "a lot" and "absolutely"), downgraders (e.g., "a bit" and "sort of"), and perceptual and affective words (e.g., "believe," "know," and "feel") [15–16].

Discourse analysis based on linguistic politeness theory is especially effective in examining interpersonal and affective social interaction [13, 17–20], but it is relatively unexplored in CMC contexts. Jung-ran Park [21] employed a linguistic politeness theoretical framework to examine interpersonal and affective social interaction in text-based synchronous and asynchronous online social interaction. Susan Brennan and Justina Ohaeri [22] found that hedges, discourse markers that function to modify semantic meaning or to mitigate the force of an upcoming utterance, are used less frequently in CMC than in face-to-face communication because keyboarding requires more time and effort than does speaking. They argue that the impression that CMC is less polite than face-to-face interaction is not because of depersonalization of the medium but rather because of the less frequent use of hedges. Joseph Walther et al. [23] found that the use of sociointerpersonal of content, as opposed to task-oriented content, is greater when there are no time restrictions on the exchange of CMC messages. Ronald Rice and Gail Love [17] employed interaction process analysis (IPA) [24] to analyze socioemotional content transcripts of electronic bulletin board postings. According to the analysis, approximately 30 percent of the content was made up of socioemotional sentences. Out of this percentage, the primary socioemotional content concerned "solidarity" (18 percent), followed by "provision of personal information" (8.4 percent).

Few studies have been conducted examining relational dimensions (i.e., socioemotional communication) in the virtual reference setting. Marie Radford [25] used a communication theory [26] to analyze interaction between librarians and users in the virtual reference context, and she points out that "relational aspects have been shown to be critical to client's perceptions of successful FtF (face-to-face) reference interactions" [25, p. 1046]. Margie Ruppel and Jody Condit Fagan's study of users of an instant messaging (IM) chat reference service [27] also found that interpersonal relations, associated with terms such as "friendliness" or "politeness," were very important for successful reference service.

Two major theoretical approaches have been used by linguists to study discourse markers associated with interactional and interpersonally oriented conversation. The discourse organization and structural coherence approach [28–30] argues that discourse is principally oriented around structural coherence and sequential coordination and that connections at a local (between two adjacent utterances) or global (between discourse segments further apart) level are vitally important for the establishment of an understanding of coherence in conversation [see 28, p. 31; 30, p.

950; 31, p. 52]. For instance, a discourse marker such as "well" is widely observed across computer-mediated communication genres. The illustration below is from an E-mail message:

> *Speaker*:   Can you join us for tomorrow's lunch with the candidate?
> *Hearer*:   Well, probably I have something tomorrow around lunch.

The discourse marker "well" manifests the functions of structural and sequential coordination and coherence between the two turns (i.e., speaker's invitation and the hearer's refusal).

However, the discourse organization and structural coherence approach is limited in its ability to address other key functions of discourse markers. In addition to indicating a new topic or a turn change, discourse markers may index the speaker's interpersonal desire to mitigate the force of an upcoming utterance such as a disagreement, an insufficient and irrelevant response, an apology, or a request [32]. In the above interaction, for example, prefacing the response with the qualifying discourse marker "well" mitigates the force of the following refusal and indexes the speaker's polite attitude and desire to avoid or mitigate face-threatening acts. Penelope Brown and Stephen Levinson [33, p. 61] define the notion of "face," the cornerstone of politeness theory, in the following way: "the public self-image that every member wants to claim for himself." Thus, face-threatening acts are utterances or actions that threaten a person's public self-image. By prefacing speech acts that threaten interlocutors' face, such as refusal as in the above interaction, disagreement, confrontation, and rejection, "well" functions to weaken the force of what follows [20–21].

Analyzing discourse from the interpersonally/interactionally oriented perspective [32, 34–35, among others] allows the researcher to identify "verbal elements in language which have as their primary function to implicitly anchor utterances vis-à-vis the communicative restraints of a culture and society, the demands of aspects of interactive politeness, and the prevalent norms of affect and involvement" [32, p. 100; see also 36, p. 177; 37, p. 193]. This perspective allows for the study of discourse markers as devices for the implementation of a politeness strategy used to lessen the force of an upcoming utterance such as a request or apology [32–33, 37–40] and in the context of negotiating strategies and as positive politeness markers and solidarity markers that lay claim to a mutual or common ground between interlocutors [35]. As illustrated, discourse markers are employed for linguistic realization of the interpersonal and affective stances of speech participants during social interaction while illuminating the primary function of discourse structure (i.e., discourse coherence).

In contrast to the face-to-face setting, the computer-mediated communication channel imposes conversational constraints on language users owing to lack of the contextual cues that are richly available in the face-

to-face communication setting. This absence of cues tends to engender linguistic ambiguity and miscommunication. Thus, information seeking and sharing through the CMC mode implicates a threat to the interlocutors' public self-image [17]. In this sense, effective interpersonal communication encompassing rapport and solidarity is a critical factor for enhancing group involvement and collaboration in online education as well as with information service in a virtual reference setting [17].

In this study, I will use an interpersonally and interactionally oriented perspective to examine communicational features of the synchronous communication channel that differ from those of the face-to-face setting. Discourse analysis based on CMC transcripts enables researchers to capture social interaction that could otherwise be obtrusive and difficult to obtain in the face-to-face setting.

An interpersonally oriented theoretical framework has great potential for examining various critical issues in LIS online education and virtual reference such as information-seeking behavior, user assessment of online interaction, and provision of insights for developing guidelines for information service, as well as for examining communicational features and sociointeractional patterns [25, p. 1056; 27, p. 194].

Methodology

Data for this study are derived from a chat group aimed at solving problems in the domain of mathematics through group collaboration. The data are generated and archived by the Virtual Math Teams (VMT) at Drexel University, sponsored by the National Science Foundation. The use of the data has been approved by the Institutional Review Board at Drexel University, and it conforms to ethical guidelines on research on human subjects.

Text-based group discussion has been collected through America Online's (AOL's) Instant Messenger (AIM) for the group chat forum. Group participants comprise three to five elementary and middle school students and a facilitator from VMT. Each participant receives a screen name through the official AIM site (http://www.aim.com/). Participants are able to see each other's screen names. The chat forum runs for approximately an hour. Before a chat forum, participants are provided with some suggestions for successful communication: sharing ideas to solve a math problem, asking about things that are not clear, and sharing solutions and the method for solving the math problem.

Facilitators' roles are similar to those of a third-party observer. Facilitators do not participate in solving the math problem. They post introductory or closing messages such as the following: "Hi . . . For privacy reasons, we're asking that you don't share any personal information about yourself,

such as your name, age, or where you live. Let's go around and have everyone share a greeting with the group." Figure 1 illustrates the contexts of the online interaction in the VMT chat group. The social variables of participants are categorized into roles and power difference. The power difference among group participants is symmetrical in the sense that all are in the same peer groups (i.e., elementary and middle school students). Conversely, the power difference between the moderator and a student is asymmetrical mostly due to differences in their respective roles in the discussion forum. There are other social variables at play, such as age, ethnicity, and gender. However, in the data, this type of information is not readily available unless participants voluntarily divulge it during group interaction. The difficulty in accessing such social variables limits the study regarding the contribution of these variables to communication and social interactional patterns.

Spatial and temporal contexts reflect a synchronous online setting. Participants communicate through keyboarding. Discussion topics vary and are related to solving math problems. Text/discourse is unplanned and composed online. Thus, misspellings are frequently observed in the transcripts utilized throughout this article. Transcripts are organized into five columns: numbered discourse lines, the screen name of participants, sentence/utterance, transferred time, and the duration between the preceding and following turns, as shown in transcript 1.

The transcripts are analyzed using discourse analysis from the interpersonally/interactionally oriented perspective. The analysis addresses the communicational features of the synchronous communication channel that differ from those of the face-to-face setting and the manner in which language users bring to bear human creativity to overcome the constraints imposed by the chat mode. Both linguistic and paralinguistic elements are identified to examine the way in which online group participants communicate their interpersonal and affective stances in presenting thoughts and arguments.

Findings

As noted above, the real-time context significantly lessens delay in the online interaction among participants, and rapid feedback enhances social relations among group participants. As well, chat participants frequently make spelling errors; this is analogous to everyday spoken language wherein users make mistakes of grammar and pronunciation. In addition, participants generally do not employ punctuation markers such as a period following a declarative utterance and a question mark following an interrogative utterance. Transcript 2 illustrates some of the features of real-time

Participants:

    Roles

        Addresser [speaker], addressee [listener], facilitator [third party]

    Power difference

        Symmetrical/Low

Setting:

    Spatial context

        Participant's own desktop

    Temporal context

        Real time

    Extent to which space and time are shared by participants

        100% in time and 0% in space--synchronous

    Channel

        Keyboarding

Text/Discourse:

    Discussion Topic

        Topics were varied and related to solving math problems.

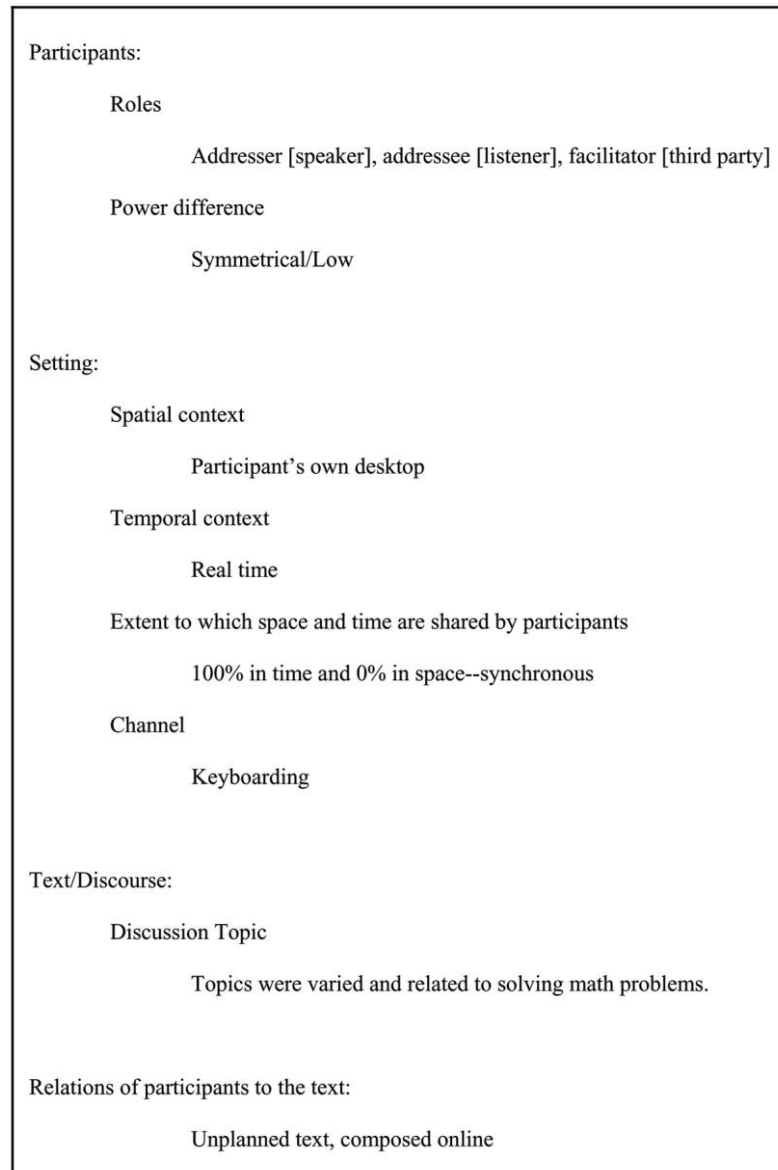Relations of participants to the text:

        Unplanned text, composed online

FIG. 1.—Contexts of online interaction (adapted from [6])

TRANSCRIPT 1

1		You have just entered room "powwow1."	8:06:43	
2		PIN has entered the room.	8:06:50	0:00:07
3		GOR has entered the room.	8:06:51	0:00:01
4		REA has entered the room.	8:06:57	0:00:06
5	MUR	Hi. Thanks for participating in our PoW-Wow. For privacy reasons, we're asking that you don't share any personal information about yourself, such as your name, age, or where you live.	8:07:08	0:00:11
6	MUR	Let's go around and have everyone share a greeting with the group. I'll start by saying that I'm really looking forward to seeing you guys talk about math tonight!	8:07:17	0:00:09
7	PIN	Im glad that we are able to meet together and share our ideas	8:07:56	0:00:39
8	MUR	Any other replies??	8:08:38	0:00:42
9	GOR	uhh	8:08:47	0:00:09
10	GOR	wsup	8:08:49	0:00:02
11	REA	i hope we can solve this	8:08:59	0:00:10
12	REA	We will	8:09:06	0:00:07
13	MUR	Great, Lets get started then!	8:09:19	0:00:13

chat, such as rapid feedback through the back channel mechanism, spelling errors, and lack of punctuation markers. (Boldface type in the transcripts indicates a matter that is discussed in the text.)

The interaction in transcript 2 occurs at the beginning of an online discussion for solving a math problem. There are three participants: DOL, WRI, and KLA (the facilitator). In lines 1, 3, 9, and 14, interrogative sentences end without a question mark. In addition, except for KLA's remarks, punctuation markers are not used (e.g., "Im" in line 17 and "thats" in line 20). Contractions of linguistic forms are also frequently used. Instances of these include a phonological contraction such as "u" instead of "you" in lines 3 and 9 and a morphosyntactic contraction such as "gonna" in line 14. Spelling errors are also observed in lines 4 (e.g., "mor") and 5 (e.g., "wirters"). Rapid feedback through a variety of discourse markers, such as "yes" as in line 18, "yeah" as in line 22, "ok" as in lines 11 and 13, and "oh" as in line 10 are also observed. Such rapid feedback contributes to the building of rapport among group participants, a positive feature of this real-time communication channel.

In addition, the online communication channel, especially in a group setting, affords simultaneous and multiple-party interaction involving multiple topics. Allowing multiple perspectives among group participants also enriches the depth and quality of chat forums and accordingly engenders knowledge building among participants through group collaboration.

TRANSCRIPT 2

1	DOL	**are we the only ones coming**	7:05:53	
2	WRI	ummmm i hope not	7:05:59	0:00:06
3	DOL	**why are u here**	7:06:09	0:00:10
4	KLA	There are two **mor** people on my list, but they aren't online yet.	7:06:12	0:00:03
5	DOL	**wirters** allure	7:06:17	0:00:05
6	WRI	to discuss the pow, of course	7:06:21	0:00:04
7	DOL	**o**	7:06:25	0:00:04
8	WRI	:-)	7:06:33	0:00:08
9	DOL	**do u think it is hard**	7:06:39	0:00:06
10	WRI	**oh let me go see it**	7:06:51	0:00:12
11	DOL	**ok**	7:07:17	0:00:26
12	KLA	I will be your facilitator, and I will start telling you more information soon. I just want to wait another minute to see if the others come online.	7:07:18	0:00:01
13	WRI	**ok**	7:07:52	0:00:34
14	DOL	**which one are we gonna do**	7:08:18	0:00:26
15	KLA	I will give you a link to the problem after I give you some instructions.	7:08:43	0:00:25
16	DOL	pk	7:08:51	0:00:08
17	WRI	I hope we'll do the algebra one but **Im** up for anything . . . as long as its not too hard lol	7:09:18	0:00:27
18	KLA	**yes**, it will be Algebra	7:09:30	0:00:12
19	DOL	ahh man	7:09:49	0:00:19
20	DOL	**thats** 2 hard	7:09:53	0:00:04
21	DOL	LOL	7:09:55	0:00:02
22	WRI	**yeah** i know . . . makes my brain hurt	7:10:01	0:00:06

Interestingly, constraints to communication in the CMC channel trigger innovative and creative adaptation and compensation. Presented below are constraints created by the text-based synchronous online channel and the strategies and creativity by which online language users endeavor to overcome such constraints.

Turn-Taking
Turn-taking is a central area of discourse analysis; it is a basic component of all conversation. Harvey Sacks et al. [41] identified three fundamental facts underlying face-to-face conversation. First, speech participants take turns speaking. Second, there is a tendency for one participant to speak at a time. Third, overlap between turns occurs infrequently; in other words, speech participants are, mostly unconsciously, cooperating with each other to produce conversational coherence through turn-taking. Thus, even

TRANSCRIPT 3

1	DOL	are we the only ones coming	7:05:53	
2	WRI	ummmm i hope not	7:05:59	0:00:06
3	DOL	**why are u here**	7:06:09	0:00:10
4	KLA	There are two mor people on my list, but they aren't online yet.	7:06:12	**0:00:03**
5	DOL	wirters allure	7:06:17	0:00:05
6	WRI	**to discuss the pow, of course**	7:06:21	0:00:04

though there are sometimes overlaps and interruptions, speech participants largely follow turn-taking rules.

Turn-taking in face-to-face interaction is accomplished through the interpolation of various linguistic devices, such as the discourse marker (e.g., "excuse me"), interruption (e.g., "sorry, but may I interject") by the hearer or audience, and invitation from the speaker, as well as paralinguistic cues such as eye contact, a rising tone of voice, a gesture, or a pause [42]. Turns are largely organized into adjacency pairs, paired sequential exchanges that signify that turns are organized into a relevant sequence [43].

Turn-taking occurs in online communication by sending typed text/talk by pressing an enter key. The effect of such turn-taking is only realized when the text/message is transferred to the receiver through the intervention of a remote server. This causes a time lag and accordingly disrupts conversational coherence [44]. In addition, the online communication channel, especially in a group setting, affords simultaneous and multiple-party interaction with multiple topics. This also causes deviation from the norms of face-to-face turn-taking.

In consequence, in online communication turn-taking rules and the adjacency pairs that serve to promote discourse coherence are violated [6]. Consequently, discourse in the online mode manifests as less cohesive than in the face-to-face mode. Multiple-party interactions, especially in a chat setting involving a large number of participants, appear as chaotic due to the disruption of face-to-face communication conventions. The sender's text is therefore presented in chronological order as it is transferred to the receiver. As seen in transcript 3, nonrelated turns without sequential organization might appear, thus disrupting interpretation of ongoing talk, especially to the novice who has little experience in real-time online discourse [45].

In lines 1 and 2 of transcript 3, the participants DOL and WRI are beginning their interaction. In line 3, participant DOL asks WRI the reason he or she is on the online chat. However, due to constraints imposed by the CMC channel, in this case lack of visual and nonverbal cues, KLA's

TRANSCRIPT 4

1	MUR	We have already passed 9p.m. It's not important that you have the answer, but you should now work on summarizing what you have found.	9:08:49	0:00:03
2	PIN	i need this for extra cred for math!	9:09:08	0:00:19
3	PIN	haha	9:09:09	0:00:01
4	REA	no way	9:09:19	0:00:10
5	REA	any ways	9:09:24	0:00:05
6	PIN	**MCP** got any ideas?	9:09:34	0:00:10
7	**MCP**	Still just the proportions I gave before.	9:09:55	0:00:21
8	REA	I got that proportional statement and the law of sines	9:10:04	0:00:09
9	REA	but i can't put it together	9:10:16	0:00:12

turn interrupts the turn adjacency pair consisting of a question and response. The difference in duration of the transference of messages of DOL and KLA is only three seconds, as illustrated on line 4. As well, KLA's message is three times longer than that of DOL. This indicates that DOL and KLA composed their messages almost simultaneously, as shown in lines 3 and 4. The response turn from the hearer (i.e., WRI) appears in line 6.

Chat participants strive to extend and maintain discourse coherence by compensating for the constraints imposed by the online setting; consequently, they deviate from face-to-face turn-taking norms. In transcript 4, participants maintain turn-taking mostly through linguistic mechanisms.

The transcript 4 excerpt is from the ongoing discussion of a math problem. As indicated by the screen name in the second column, there are four participants (i.e., MUR, PIN, REA, and MCP). In the first line, the moderator (MUR) informs all that group discussion time is almost over and asks participants to summarize their group activity. In response, PIN indicates earnest interest in continuing the discussion by providing a reason (i.e., extra credit for math). This affective stance and the indication of PIN's desire for continuing the discussion is realized by the exclamation mark and by the subsequent verbal laughing (i.e., "haha"). To this, REA provides feedback (i.e., "no way") in line 4, following this with a discourse marker (i.e., "any ways") for topic change from the conversational exchange between PIN and REA in line 5.

During the ongoing and previous interaction among this group, MCP is silent. In line 6, PIN invites MCP's input on the math solution by employing the screen name ("MCP got any ideas?"). This kind of creative maintenance of the adjacency pairing of turns contributes to discourse coherence. In the synchronous communication mode, a linguistic feature such as an address form (i.e., names) is the most commonly used mechanism for turn-taking.

Contractions of Linguistic Forms

The text-based online communication channel constrains natural conversation flow among participants, particularly because keyboarding is almost always slower than speaking. In addition, due to the lag time in the process of transferring a message, natural conversational flow is inevitably inhibited. Speakers innovatively compensate for these limitations by employing a variety of strategies, such as the contraction of morphosyntactic and phonological linguistic contractions. Contraction is one of the stylistic characteristics of everyday informal language use, whether in the mode of written or spoken communication, as is illustrated in figure 2.

The interaction in transcript 5 illustrates linguistic contractions. Examples include "wanna," "k," and "wat u."

In addition to linguistic contractions, language users have conventionalized new types of abbreviations, acronyms, and shorthand for online communication to increase typing speed [1]. For example, the following shorthand strategies are used prevalently in online and e-mail communication: FYI (for your information), BTW (by the way), and ASAP (as soon as possible).

In order to compensate for lack of real-time conversational flow, chat participants frequently employed such abbreviations, acronyms, and shorthand strategies, as is illustrated in transcript 6. See lines 1 ("prob"), 3 ("2"), 5 ("lol\"), 6 ("i g2g"), and 7 ("cyga").

Prosodic Features

Text-based online communication does not afford communication participants use of prosodic features such as intonation, accent/stress, pause/silence, and tone of voice [1, 4, 46]. Prosodic features enable speakers to convey a variety of sociocognitive as well as emotional meanings. For instance, a sudden realization of new information can be encoded by prosodic features of the discourse marker "aha" with a high pitch on the second syllable "ha."

Online communication participants creatively employ a variety of strategies to deliver prosodic features. Linguistic devices drawn from orthography, such as spelling, punctuation, and shorthand, together with typographic devices such as capitalization, are widely used for this purpose. For instance, lexical substitutes (e.g., hmmmm, huh, duh) for prosodic features are commonly used in turn exchanges, as shown in the adjacency pair with use of "ummmm" in transcript 7).

The lexical substitute (i.e., "ummmm") marks the tone of voice of WRI in relation to the previous turn. Such lexical substitutes of prosodic features set emotional and affective stances of the speaker, such as disappointment, thinking and reconsideration, doubt, frustration, sarcasm, and misunderstanding. Language users in the synchronous communication mode cre-

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1. Phonological contraction:

- them > 'em

- and > an (e.g., rock and roll > rock an' roll > rock 'n roll)

- you > yo > u

- because >'cause

- okay>ok> 'k

- driving > drivin'


2. Morpho-syntactic contraction:

- He is going to be a teacher > he's gonna be a teacher.

- Did you eat? > Jeet?

- I got to go > I gotta go.

- I want to have banana > I wanna have banana.

- I must have been > I must've been

- all right > alright
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Fɪɢ. 2.—Linguistic contractions

TRANSCRIPT 5

1	PIN	**wanna?**
2	MCP	I need to look at it. You got my screenname
3	PIN	**k**
4	MET	here is **wat u** missed:

TRANSCRIPT 6

1	MCP	This **prob**, or the parallelogram?
2	PIN	the parallelogram
3	DOL	im trying **2** figure it out
4	DOL	no dont send it
5	DOL	**lol**\
6	DOL	**i g2g**
7	DOL	**cyga**

atively use such prosodic features by manipulating letters, such as redu-
plicating a certain vowel or consonant:

"I looooooove your observation!!!"

"slow doooooooooowwwwwwn"

"Huzzah!"

"*Noooo.*"

"Hmmm, let me think about it."

As illustrated earlier (see transcript 2), chat users mostly do not employ
punctuation markers for grammatical purposes. Instead, they employ punc-
tuation to express emotional and cognitive stances such as appreciation
of comments (e.g., "That's a great idea!!!" or to express confusion and to
elicit clarification.

In line 1 of transcript 8, MCA presents a solution for the math problem
to group members PIN and REA. REA perceives a difference in math
proficiency and addresses PIN by name, following with a question (i.e.,
"PIN where are you in math" [lines 16 and 17]). Note that there is no
question mark in this interrogative sentence.

In lines 18 and 19 PIN expresses his/her confusion by employing a lexical
substitute for the prosodic feature ("uhh") followed by a question with an
explicit punctuation marker ("like level?"). In line 20, REA disambiguates
PIN's confusion by elaborating on the question, initiated with a discourse
marker ("yeah") that explicitly marks agreement ("yeah, geo., alge., or

TRANSCRIPT 7

1	DOL	are we the only ones coming	7:05:53	
2	WRI	**ummmm** i hope not	7:05:59	0:00:06

algebra2"). To this, in line 21 PIN expresses clear understanding by preceding the discourse marker ("oh") with a prosodic feature realized through repetition of the consonant *h*, as in "ohhh." The number of such punctuation markers also indicates variation in degree of affective and cognitive stances. For instance, three exclamation marks (!!!) indicate the intensity of the speaker's message. In the same way, the question mark can be employed to signal a degree of confusion.

Silence and pause hold a variety of linguistic functions during social interactions. For instance, in Asian culture, speakers strategically employ silence to mitigate a disagreement with communicative participants. Silence is also a device for holding the conversational floor by signaling unfinished and upcoming utterance. Chat participants utilize the ellipsis marker (. . .) to realize such functions.

Transcript 9 presents shorthand mechanisms utilized to compensate for the lack of prosodic features in the synchronous communication channel. As mentioned, in the synchronous online channel, rapid feedback is often

TRANSCRIPT 8

1	MCP	Tri ABC similar to DEC	8:53:10	0:00:24
2	PIN	ya we got that	8:53:19	0:00:09
3	MCP	AB:DE = 8:5, right?	8:53:30	0:00:11
4	REA	We know that	8:53:33	0:00:03
5	PIN	ya	8:53:35	0:00:02
6	MCP	So BC:EC=8:5	8:53:51	0:00:16
7	REA	ya	8:54:11	0:00:20
8	MCP	That 8 breaks down 3 for BE, 5 for EC	8:54:23	0:00:12
9	REA	We might have to use law of sines	8:54:38	0:00:15
10	PIN	havent learned that yet	8:54:50	0:00:12
11	PIN	whats it say	8:55:04	0:00:14
12	MCP	Sine A / a = Sine B / b = Sine C / c	8:55:15	0:00:11
13	MCP	in any triangle	8:55:23	0:00:08
14	REA	right	8:55:28	0:00:05
15	REA	it is like A/sin a= B/sin b= C/sin c	8:55:55	0:00:27
16	REA	**PIN**	8:56:05	0:00:10
17	REA	**where are you in math**	8:56:12	0:00:07
18	PIN	**uhh**	8:56:28	0:00:16
19	PIN	**like level?**	8:56:38	0:00:10
20	REA	**yeah** geo., alge, or algebra 2	8:57:11	0:00:33
21	PIN	**ohhh**	8:57:15	0:00:04
22	PIN	geometry honors	8:57:19	0:00:04
23	PIN	freshman	8:57:27	0:00:08
24	REA	what grade	8:58:03	0:00:36
25	PIN	9	8:58:13	0:00:10
26	REA	i am in 6 th	8:58:28	0:00:15
27	REA	grade	8:58:32	0:00:04

TRANSCRIPT 9

1	REA	Are u there ping ponger 805	8:48:08	0:00:17
2	PIN	Ya im here	8:48:29	0:00:21
3	REA	checking	8:48:37	0:00:08
4	REA	u stuck cause i am:-(	8:49:07	0:00:30
5	PIN	well angle CED is congruent to angle B	8:49:56	0:00:49
6	PIN	if that helps	8:50:06	0:00:10
7	REA	It helps	8:50:48	0:00:42
8	REA	but I already established that	8:51:15	0:00:27
9	PIN	Im stuck	8:51:36	0:00:21
10	MCP	What's known?	8:51:42	0:00:06
11	MCP	BE:EC = 3:5, right?	8:52:05	0:00:23
12	**REA**	**How did you get that**	**8:52:42**	0:00:37
13	**PIN**	**How did u get that**	**8:52:43**	**0:00:01**
14	**PIN**	**lol**	8:52:46	0:00:03

possible. In line 1 of transcript 9, REA seeks PIN's feedback on a math problem by ascertaining PIN's presence. Both REA and PIN indicate a struggle with the math problem. At this point, in lines 10 and 11, MCA presents a solution for the math problem to the group. REA responds, "how did you get that." From the difference in duration of transference of messages by REA and PIN in lines 12 and 13, we can deduce that PIN's identical question is produced almost at the same time with REA; there is only a one second difference, as seen by the post times in lines 13 and 14 (8:52:42 and 8:52:43, respectively, for REA and PIN). In line 14, PIN realizes this overlapping with REA's question and responds to this by laughing, which is indicated by the shorthand "lol" (i.e., laughing out loud).

Additionally, in order to mark emphasis in the speaker's talk, chat participants employ a typographical device such as capitalization of a certain word in the body of the message (e.g., "OVERALL, I'm substantially satisfied with my performance last year"). Such a typographical device is also used to express the speaker's emotional state, such as shouting for attention, anger, frustration, and annoyance, as shown by employing an all-capitalized utterance/sentence, as shown in lines 6–8 in transcript 10).

The interaction in transcript 10 occurs among group members (AVR and SUP) and the discussion facilitator (GER). In line 1, AVR employs a question mark to build rapport and confirmation from group participants ("Last thing you did was area?"). The question mark therefore serves as a discourse marker signifying "right?" rather than as an interrogative marker functioning to seek a response from the hearer.

SUP responds with a question in lines 2 and 3 of transcript 10. In line 5, AVR responds to SUP on this question with lowercase letters. The adjacency pair (question and response) is disrupted by GER's turn. In line

TRANSCRIPT 10

1	AVR	Last thing you did was area?	9:09:19	0:00:03
2	SUP	what do we do with the area	9:09:23	0:00:04
3	SUP	after we get it	9:09:26	0:00:03
4	GER	would you like some help?	9:09:32	0:00:06
5	AVR	basically we want an equilateral triangle whose area is the sum of the areas of two 9 and 12 triangles	9:09:40	0:00:08
6	AVR	NOOOO	9:09:41	0:00:01
7	AVR	WE DON'T WANT HELP	9:09:44	0:00:03
8	AVR	LET US FIGURE IT OUT	9:09:47	0:00:03
9	SUP	ok	9:09:50	0:00:03
10	SUP	calm down	9:09:52	0:00:02

4 GER offers help to the group participants. As can be seen, AVR's message in line 5 is four times longer than that of GER's in line 4. Consequently, AVR's typing takes much longer than that of GER.

Interestingly, in lines 6–8, AVR produces very short messages with all capitalized letters while expressing refusal of suggested help from the facilitator GER. Such dramatic change of capitalization from regular lowercase, as in lines 1 and 5, to all capitalized letters, as in lines 6–8, emphasizes AVR's refusal and frustration. This signal is also received by group member SUP as in lines 9 and 10 ("ok" and "calm down").

Despite the lack of a mechanism to deliver prosodic features that carry affective and interpersonal meanings, chat users have evolved means of expressing such meanings by utilizing a variety of creative devices such as punctuation markers, typographical manipulation, and orthographic manipulation through repetition of vowels or consonants and verbal shorthand. This allows for the sharing of a hidden "voice-over" in text-based synchronous group interaction.

Gesture and Facial Expressions
During social interactions in face-to-face settings, speakers employ various nonverbal devices in order to align and to modify their verbal exchanges and to enhance communicational flow. Nodding, eye contact, and facial expressions to show interest, understanding, or confusion in response to the speaker's utterance are such realizations of nonverbal communication. Through the process of language acquisition of a mother tongue, languge users are equipped with the capacity to use such devices effortlessly and tactically in face-to-face interactions.

Online language users have developed such nonverbal communication devices through a variety of keyboard icons and graphical symbols [2, 47]. For instance, the so-called smiley face [i.e., ☺, :)] is prevalent across CMC

TRANSCRIPT 11

1	MUR	It's almost 9p.m., would you like to go on discussing the problem or shall we wrap it up?	8:58:40	0:00:08
2	REA	really	8:58:40	0:00:00
3	REA	go on	8:58:48	0:00:08
4	PIN	lets try to finish	8:58:50	0:00:02
5	PIN	the prob	8:58:56	0:00:06
6	MUR	OK then:-)	8:59:11	0:00:15
7	PIN	its 6 out here in sunny california :-)	8:59:32	0:00:21
8	MCP	I'm here, but I'm thinkin'	8:59:42	0:00:10
9	PIN	any ideas?	9:00:00	0:00:18
10	REA	ha	9:00:41	0:00:41
11	REA	I think it is 5	9:01:23	0:00:42
12	REA	the ans	9:01:29	0:00:06
13	PIN	thats means its isoceles	9:01:39	0:00:10
14	PIN	triangle DEC	9:01:47	0:00:08
15	REA	yeah	9:01:55	0:00:08
16	REA	it is just a guess	9:02:27	0:00:32
17	REA	MUR, are we getting anywhere	9:02:58	0:00:31
18	PIN	ya, help us out :-)	9:03:32	0:00:34
19	MUR	no comment, sorry:-)	9:03:47	0:00:15

genres. Emoticons are graphical representations of interpersonal and emotional features, expressed through gesture and facial expressions in face-to-face interactions, in the online setting.

In the interaction in transcript 11, there are three group members (REA, PIN, and MCP) and a facilitator (MUR). In the first line, the facilitator indicates that time is almost up for the group discussion by mentioning the actual time (i.e., "it's almost 9p.m."). The facilitator also suggests two options, discussing the math problem or wrapping it up. The facilitator agrees to the group's choice in line 6 by employing the discourse marker "OK" followed by the emoticon (i.e., smiley face). In the next line, line 7, group member PIN comments about the time difference by saying "its 6 out here in sunny california" followed by the same smiley graphic. The emoticons function to index the speakers' affective stances. Such an affective stance is also observed in lines 18 and 19.

Discussion and Future Studies

Text-based synchronous communication imposes limitations for language users to realize the flow of affective and interpersonal stances that naturally occurs in the face-to-face setting. However, online language users have demonstrated dynamic creativity and innovation in compensating for these

limitations by utilizing a variety of tactics to express affective and interpersonal stances.

Group support and collaboration is noticeably observed as a primary characteristic of online group information seeking and sharing for solving problems in mathematics. Such support is realized through using interpersonal and affective communicational features to seek and build rapport, social presence and cohesion, and solidarity. In addition, spontaneous spoken language features such as prosodic features, turn-taking by addressing someone's name, back channels, and informal communication exchange frequently occur in a chat setting. These features also contribute to the building of rapport among participants.

The findings of this study offer insights for other forms of group discussion, for example, synchronous or asynchronous online education or dyadic interaction between a librarian and user in a virtual reference setting. The analysis of data suggests that, in the online social interaction of K–12 students, discourse participants express interpersonal and affective stances by employing a variety of creative mechanisms derived from linguistic and paralinguistic devices, such as contractions of linguistic forms, prosodic features, gestures, and facial expressions (in the case of emoticons). This use suggests that effective interpersonal and emotional communication is a critical factor in enhancing group involvement and collaboration as well as for providing information service in the LIS context.

There are limitations of this study, which will be addressed in future studies. Quantitative analysis in conjunction with qualitative discourse analysis of data will contribute to deepening the findings of the study. Speech act types, comparison among different discussion topics and social variables (e.g., age, gender, power, social distance, and experience of CMC channel), and individual variations of online language users also need to be examined. Comparison between small group (range from three to five members) and large group (over five members) interaction also needs to be examined to ascertain the comparative effectiveness of the text-based synchronous communication channel between the small and large groups.

Other areas for future study include a comparison of affective and interpersonal features that occur in different genres of CMC, such as online education, virtual reference, and Web blogs, and variations in interpersonal and affective communication features in a variety of asynchronous and synchronous communication channels. The application of findings drawn from studies on interpersonal and affective aspects of communication to user interface design is also a critical research area for future studies.

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