

(2010). Paper accepted for presentation at the 96th Annual Convention of the National Communication Association, November 14-17.

Gender, Communication, and Self-Presentation in Teen Chatrooms Revisited: Have Patterns Changed?

Sana Kapidzic
*Department of Telecommunications
Indiana University, Bloomington*

Susan C. Herring
*School of Library and Information Science
Indiana University, Bloomington*

Introduction

Teenage years are the time when identity and sexuality start to play major roles in the lives of young adults as they seek to define and explore who they are (Erickson, 1968). Subrahmanyam, Greenfield, and Tynes (2004) identified teenage chatrooms as a new and rich data source for the study of teenage development, in that they provide insight into the kind of unmonitored teenage interaction that researchers normally lack access to. A study conducted in 2007 by the Pew Internet and American Life Project showed that of the estimated 93% of teens who use the Internet in America, nearly 20% still visit chat sites, despite the growing competition from instant messaging and social network sites. In this paper, we examine teenage chat sites for the purpose of identifying possible gender preferences in the online communication and self-presentation strategies of teenagers.

The study of gender differences in computer-mediated communication (CMC) has a long history, relative to the study of CMC as a whole. As early as 1991, Selfe and Meyer reported gendered power dynamics in an asynchronous academic discussion list, with men and high-profile members of the community dominating communication, even under conditions of pseudonymity. In the early 1990s, Herring (1992, 1993, 1994) identified gender preferences in discourse style among adults posting messages to academic discussion lists: Women tended to use more hedges and politeness markers and manifest a more supportive attitude towards their addressees in comparison with men, who tended to make more strong assertions, violate conventional politeness norms, and adopt a more adversarial stance towards their interlocutors. These observations received subsequent support in studies by Thompson and Murachver (2001) and Guiller and Durndell (2006), among others.

The picture for chat environments has always been less clear. Some scholars writing in the mid-1990s contended that traditional gender binaries were blurring and breaking down in synchronous chat environments such as MUDs and MOOs¹ (Danet, 1998) and Internet Relay Chat (Rodino, 1997), due to the greater anonymity afforded by these text-only technological environments, which renders them conducive to playful experimentation with identity. At the same time, Cherny (1994) observed that stereotypically gendered patterns of behavior were reproduced in playful textual actions performed in a social MOO, and Herring (2003) found gendered discourse patterns in the

pseudonymous Internet Relay Chat channels she studied, including teen channels, during the mid-1990s: Females smiled and laughed more, while males were more aggressive, including sexually.

More recently, Subrahmanyam et al. (2004) reported that girls were quite sexually assertive in the two teen chatrooms they studied, although Subrahmanyam, Smahel, and Greenfield (2006) found that similar to offline behaviors in romantic pursuits, those who identified as female online were more likely to use sexually implicit communication, whereas those identifying as male were more likely to use sexually explicit communication. Moreover, in a study of adolescent blogs, Huffaker and Calvert (2005) found few gender differences in frequencies of words expressing cooperation and passivity, which they had expected females to use more of based on past gender and CMC research. In general, in her study of teenagers' Internet use, Gross (2004) found that male and female teenagers do not differ greatly in their online habits or behavior.

These last observations point to an important issue, which is that times – and technologies – have changed since the gender and CMC research conducted in the 1990s. Young people today, heirs to the benefits of the second wave of the feminist movement in the late 20th century, have been claimed to be more gender egalitarian in their interactions and androgynous in their self-presentation than previous generations (Twenge, 1997). At the same time, the development of so-called Web 2.0 technologies, with their convergence of multimodal, communicative, and collaborative features, has given rise to mega-sites popular with teens, such as the social network site MySpace (boyd, 2008). Web-based teen chat sites, too, have taken on a new complexion, incorporating such features as asynchronous discussion forums, polls, and testimonials; 'avatars', or visual representations of each user attached to their posted messages; and user profiles, in which personal information about teen users may be presented along with real-life photographs.

These technological changes suggest that anonymity is less a feature of chat sites now than it was in the past, and raise the question of how and to what extent gender identity is expressed on such sites. Indeed, although all of the sites analyzed for the present study offer users the possibility of hiding their gender, most teenage users choose to identify themselves as male or female (e.g., through the choice of distinctly male/female nicknames and/or photos and avatars). This gives researchers the possibility to examine and compare systematically male and female communication and self-presentation strategies.²

The purpose of this study is to evaluate empirically the claim implicit in much recent gender and CMC research that expressions of gender distinctness among teens in online environments are becoming less frequent and less traditional. Discourse and content analysis methods are employed to examine gender preferences in linguistic features and communication styles in synchronous text chat messages, along with self-presentation in user profile pictures, drawing on data from five popular teen chat sites collected in early 2010. We find that micro-level linguistic features, including lexical choice and most speech acts, show few gender differences, but clear differences are

found in message tone, as well as in physical stance, dress, and social distance in photographs. Moreover, the differences generally conform to traditional gender stereotypes. We interpret these findings in light of previous gender and teen CMC research; adolescent development patterns; and trends towards media convergence in contemporary chat platforms.

Background

Much research has been conducted on the topic of whether males and females communicate differently and if so, at what level of communication differences are evident. Unlike in languages such as Japanese, where men and women use different forms for the personal pronouns ‘I’ and ‘you’, or in the Romance languages, where agreement with the gender of the speaker is obligatorily marked on adjectives, gender differences in English tend to be a matter of preference, rather than grammatical requirement (Coates, 1993). This leaves open the possibility that men and women in English have different grammatical *preferences*; indeed, research by Argamon, Koppel, and Shimoni (2003) indicates that this is the case. These researchers trained a machine-learning algorithm to identify the gender of writers of various genres of texts with an 80% degree of accuracy, based solely on the frequency of use of grammatical function words: Female writers were found to use more personal pronouns, while male writers used more noun determiners (articles, demonstratives, and quantifiers) – a finding that the researchers explained in terms of females having a more interactive, interpersonal style as compared to males, who tend to communicate more about things than about people. Relatedly, Pennebaker, Mehl, and Niederhoffer (2003), using an automated analysis program they developed based on word frequencies (LIWC), identified significant gender differences, including personal pronouns, in writing samples of various print genres and speech transcripts of conversations on a diverse range of topics.

Interestingly, however, little evidence has been found of gender differences on the grammatical or word level in CMC. Guiller and Durnell (2006) studied students’ language use in computer-mediated discussion groups and found few gender differences in linguistic features, although stylistic gender differences were evident. Herring and Paolillo (2006) analyzed the frequency of the grammatical features identified by Argomon et al. (2003) in adult blogs, and found that when blog genre (personal diary vs. ‘filter’ blogs focusing on external events) was taken into account, gender differences disappeared. Herring and Paolillo suggest that it is the genre of writing, rather than the gender of the writer, that determines the extent to which lower-level grammatical features are used, and that Huffaker and Calvert’s (2005) finding of few gender differences in lexical choice in teen blogs may be due to the fact that the latter’s data were all of the same genre, diary blogs, where the teens of both genders wrote about the same topics: the writers’ thoughts, likes and dislikes, love lives, and daily routines. Koch et al. (2005) also found few gender differences in their experimental study of gender construction in chat groups, where all the undergraduate student subjects were engaged in the same activity, discussing the same topic.

On the face of it, these findings might be taken to support Rodino's (1997) and Danet's (1998) claims that traditional gender binaries are breaking down in CMC, were it not for the fact that research has repeatedly found evidence of gender differences in CMC at discourse and stylistic levels. Herring (1992, 1993, 1994, 2003) found that in academic discussion groups women tend to apologize, appreciate and thank more, as well as to perceive and be upset by violations of politeness, more than men, whereas men are less likely to be concerned with politeness and more readily violate online etiquette. In Internet Relay Chat rooms, Herring (2003) observed that females tend to type representations of laughter and smiling more, while males tend to use more profanity, more sexual language, and to be more aggressive. Cherny (1994) found similar patterns in a social MOO: Females performed more affectionate textual acts such as 'hugs,' while males performed more violent acts such as 'kills.' Similarly, in asynchronous discussion groups, Guiller and Durndell (2006) found that males and females were similar in their use of individual linguistic variables (with the exception of intensifiers, which more females used than males). However, significant gender differences were found in the use of many stylistic variables: Males were more likely to use authoritative language and to respond negatively in interactions, while females were more likely to explicitly agree and support others and make more personal and emotional contributions. Similarly, in the analysis of positive and negative message tone on MySpace profiles, Thelwall, Wilkinson, and Uppal (2009) found that female messages had a positive tone significantly more often than did male messages.

Thelwall et al.'s study is one of a small number of studies to examine gender differences in social network sites. Sites such as MySpace and Facebook are rapidly gaining in popularity, including among teens. They offer users the possibility to create profiles and upload pictures of themselves, and many have incorporated synchronous chat as a feature to enhance interaction. However, very few studies have analyzed users' visual self-representations in multimodal online communication environments. An exception is Scheidt (2004), who studied visual self-presentation in a moderated graphical teen chat environment. She found that female avatars tended overwhelmingly to be seductively posed and partially clad, while male avatars tended to be fully covered, to the point of hiding their eyes – which tended to look down or away from the viewer – under hair or caps. Similarly, in their study of photographic self-representations of college students on MySpace, Manago, Graham, Greenfield, and Salimkhan (2008) found a pervasiveness of sexualized female self-presentations. However, a new finding was that males in Manago et al.'s MySpace corpus tended to present themselves in more attractive, sexualized ways.

Research Question and Hypotheses

The overarching question that guides this research is: To what extent, and in what ways, are gender differences manifested in contemporary teen chat sites? We address this question by analyzing four levels of communication—linguistic, discourse-pragmatic, stylistic, and visual. Based on the literature surveyed in the previous section, we posit the following hypotheses:

- H1: Few, if any, gender differences will be found on the level of individual word choice (linguistic level) in teen chatrooms.
- H2: Gender differences will be found on the discourse-pragmatic level. Specifically:
H2a. Boys will use language that is more assertive, resolute, and active.
H2b. Girls will use language that is more passive, cooperative, and accommodating.
- H3: Stylistic gender differences will be found. Specifically:
H3a. Boys' communication will tend to adopt a more flirtatious and overtly sexual tone.
H3b. Girls' communication will tend to adopt a more positive, friendly tone.
- H4: Gender differences will be found in self-representation in profile photographs. Specifically:
H4a. Girls more often than boys will be shown in suggestive clothing or undress.
H4b. Girls more often than boys will present seductive behavior.

These hypotheses are based on the findings of the available relevant research and do not specifically posit a change (e.g., towards fewer gender distinctions). Rather, as a heuristic, we adopt the conservative assumption that what has been found in previous studies of gender and teen chat is likely to be still true. However, the hypotheses are also subject to disconfirmation, in which case, these assumptions would clearly need to be reconsidered.

Data Sample

The sites for analysis were chosen by first attempting to compile an exhaustive sample of teen chat sites from multiple sources: a Google search for the key phrase "teenage chat," two chat directories, and by following links from sites identified by the preceding searches as teenage chat sites. The sample was subsequently narrowed down to a judgment sample based on popularity. Site popularity was defined as user frequency (individual visits per month) and identified using the website rank page www.quantcast.com. The five highest-ranked sites in the sample were selected for analysis:

1. www.teenchat.com
2. www.teenspot.com
3. www.321teenchat.com
4. www.free-chat-rooms.org/teenchat.htm
5. www.chitchatting.com/teen.html

A sample of one hour of chat was collected from all five sites simultaneously, and the first 200 messages from each were selected for analysis, excluding all overt advertisements (e.g., "Are You Single? Meet cute singles now! Go to: <http://single.chat-avenue.com>"), for a total of 1,000 messages.

All messages were coded for the demographic variable of *gender* (male/female/NA). Gender was identified by analyzing userIDs, as well as the thematic content of messages. Messages from the userID "MizSweetGirl," for example, were coded as female, those from "RandomBoy15" as male, and a message with the content

“Bored 18/m/PA here with PICS, any one wanna hit me up????????” from the user “bonanza2142” was coded as male. Messages from users with non-gender-distinct IDs such as “dsds” were analyzed and coded as NA if further examination of their content did not reveal the gender of the author. Overall, 614 messages were from male users, 339 from female users, and for 47 messages the gender could not be identified.

Three out of the five originally selected sites contained either no images apart from the site logo or had only graphical images (ranging in number from 1 to 16). Two of the five chat sites (teenspot.com and teenchat.com) allow user profiles where users can describe themselves and upload profile pictures. For the purpose of image analysis, profile pictures from the site teenspot.com were analyzed. Profiles from teenchat.com were considered for analysis but discarded, because the site crops images uploaded by users, such that a full analysis of the images was not possible.

The teenspot.com site has a search feature that randomly selects user profiles according to search criteria. For the purpose of analysis, two searches were conducted, one for female and one for male users between the ages of 16 and 19. The first 100 images from each search were taken into the sample for analysis. Profiles that did not contain a profile picture were not excluded, since we were also interested in knowing what percentage of users of each gender chose to represent themselves with photographs. The final sample consisted of 200 profile images (100 male, 100 female), which were coded using the same variables for both genders.³

Methodology

The data were analyzed using discourse analysis and content analysis methods on four levels: linguistic, discourse-pragmatic, stylistic, and visual. The methodological procedures followed for each level are described below.

Linguistic Features

All of the chat messages were analyzed using the free online version of the Linguistic Inquiry and Word Count (LIWC) tool developed by Pennebaker, Booth, and Francis (2001). This program has been used by Pennebaker et al. (2003) to identify gender differences in language use. The online version provides automated counts of seven key linguistic features: self-references (I, me, my), social words, positive emotions, negative emotions, overall cognitive words, articles (a, an, the), and big words (> 6 letters). The program was run for all the female messages and all the male messages separately for each of the five chat sites.

Discourse-Pragmatic Features

The approach adopted to analyze discourse-pragmatic features in this study was speech act analysis, which is concerned with the intended meaning of utterances (Levinson, 1983). All of the chat messages were manually coded by the authors according to a *CMC Act Taxonomy* developed by Herring, Das, and Penumathy (2005). The CMC Act Taxonomy is derived from Bach and Harnish's (1979) classic classification of speech acts combined with Francis and Hunston's (1992) classification scheme for acts used in spoken conversation, adapted to fit the medium of online communication and simplified for ease and reliability of coding. After coding all messages according to the 16 categories of the original taxonomy, the categories 'thank' and 'manage' were excluded because no messages in the data occurred in those categories, and an additional category 'summon', was identified as being relevant to the data and added. The resulting adapted taxonomy thus consists of the following 15 CMC acts: inquire, request, direct, invite, inform, claim, desire, elaborate, accept, reject, react, repair, apologize, greet, and summon. Each message was coded for only one act; in cases where more than one act could have applied (e.g., reject and react), the most specific applicable act was assigned (in this example, reject).

Stylistic Features

Additionally, all messages were coded for *message tone*, using categories adapted from Herring (2007)—aggressive, friendly, and neutral—together with three other categories that emerged from our chat data: mild negative, flirtatious, and sexual, for a total of six coding categories. Each message was coded for only one tone. In cases where more than one tone could have applied, the most marked tone was assigned according to the following hierarchy: sexual > aggressive > flirtatious > friendly/mild negative > neutral.

Image Features

The profile images were coded according to three variables, following established methods of visual content analysis. The images were first coded for the variable *social distance*, first identified by anthropologist Edward Hall (1966) as part of his ideas on "proxemics," the study of how people use and perceive space. Kress and van Leeuwen (1996) applied Hall's categories of individuals' perception of the space around them as intimate, social, and public to the perceived social distance of figures in an image from the perspective of the viewer of that image. They identify and define six values: intimate (head only), close personal (head and shoulders), far personal (from the chest up), close social (from the knees up), far social (entire figure is visible), and public (multiple figures are visible).

Next, the images were coded for the variable of *behavior*. Building on the observations of sociologist Erving Goffman (1979) about the differing representations, in terms of gaze and posture, of men and women in magazine advertisements, together with Kress and van Leeuwen's (1996) observation that the gaze of a subject in an image can affect the viewer's perception of that subject, Bell (2001) formulated the variable

behavior, defining its values as: offer/ideal, demand/affiliation, demand/submission, and demand/seduction. To these, we added the value: other.

Last, all images were coded for the variable *dress*. This variable was first put forward by Soley and Reid (1988) to compare the degree to which models in advertisements were dressed in the 1960s and late 1980s, and to argue that models were wearing less at the time of their study than they had been 20 years earlier. The variable was later adopted by Lambiase (2003) in a study of the portrayal of male and female celebrities on their official Web homepages and fan sites. The values used are: demure, suggestive, partially clad, and nude. An additional category of NA was added for images at intimate distance (head only) in which the subject’s clothing was not visible.

The data were coded by two coders. To assess inter-rater agreement, 400 messages (all messages from two of the sites from the sample) were coded independently by both authors; an inter-rater agreement level of 80% was achieved for CMC acts and 81% for message tone. The coded samples were discussed and all disagreements were resolved. The remaining data were then coded by the first author. For the images, 100 (50 male and 50 female) were coded by both authors. Inter-rater agreement was 100% for the variable of social distance, 94% for the variable of dress, and 84% for the variable of behavior. After the coded images were discussed and all disagreements were resolved, the remaining image data were coded by the first author.

Findings

The LIWC analysis of the linguistic features of 1,000 messages reveals that the chat messages are overall high in social expression, while being low in cognitive expression, use of definite articles, and big words, compared with the measures for both formal and personal texts provided by the analysis program (Table 1). No strong differences are evident between the word usage of male and female teenagers, and where differences appear in the overall values for each gender, there is considerable variability across the chat samples (see Appendix, Table 1), suggesting that the frequencies of the keywords measured by LIWC are sensitive to local contextual factors such as topic of discussion. Nonetheless, there is a tendency for boys to use more self-reference words, social words, articles, and big words in most of the samples. Girls, in contrast, tend to express more negative emotions (males 1.87/ females 3.0) and positive emotions (males 2.26/ females 3.1), although the values for the latter across chat samples are quite variable.

	Self - references	Social words	Positive emotions	Negative emotions	Cognitive words	Articles (a, an, the)	Big words (>6 letters)
Formal texts (reference provided by LIWC)							
	4.2	8.0	2.6	1.6	5.4	7.2	19.6
Personal texts (reference provided by LIWC)							
	11.4	9.5	2.7	2.6	7.8	5	13.1
Male (N=614)	7.68	11.86	2.26	1.87	3.43	3.41	10.73
Female (N=339)	5.63	10.08	3.1	3.0	4.19	3.26	9.56

Table 1. Key linguistic features (values normalized per 1000 words)

The CMC act analysis reveals that ‘inviting’ is the most frequent act in the chat messages overall, followed by ‘claiming’ and ‘reacting.’ Most individual acts, including subjective ‘claims’, do not show gender differences. However, boys ‘invite’ notably more often than girls do, and girls ‘react’ more often than boys do (Table 2; see also Appendix, Table 2). Because the numbers for some individual acts are small, these patterns emerge more clearly when functionally-related acts are grouped together into act categories (Figure 1).

Manipulative acts							
	invite		direct				
Male (614)	166 (27%)		42 (7%)				
Female (339)	55 (16%)		17 (5%)				
Information exchange acts							
	inquire			inform			
Male (614)	60 (10%)			44 (7%)			
Female (339)	41 (12%)			26 (8%)			
Reactive acts							
	reject	react	apologize	accept			
Male (614)	15 (2%)	77 (13%)	1 (0.1%)	9 (0.1%)			
Female (339)	14 (4%)	58 (17%)	2 (1%)	9 (3%)			
Other CMC acts							
	request	claim	elaborate	repair	summon	greet	desire
Male (614)	0 (0%)	104 (17%)	35 (6%)	3 (1%)	11 (2%)	35 (6%)	8 (1%)
Female (339)	3 (1%)	57 (17%)	25 (8%)	1 (0.5%)	7 (2%)	19 (6%)	1 (0.5%)

Table 2. CMC act results

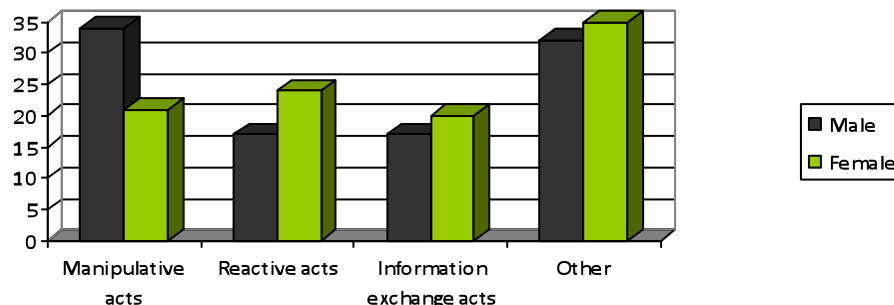


Figure 1. CMC act categories (results normalized as percentages of all messages per gender)

These groupings show that males use more manipulative acts (males 34%/females 21%), while females use more reactive acts (males 17%/females 24%) and tend to use somewhat more acts that contribute to information exchange (males 17%/females 20%). Examples of each act category used more frequently by one or the other gender are given in (1):

(1)

React (reactive): “wow” ; “ugh” ; “wat!” ; “lmao” ; “omgggg”⁴ (F)

Inquire (information exchange): “marionette u not a mod, r u ?” (F)

Invite (manipulative): “Any hot chicks want to get dirty a hot 15/m?? msg mee hunz =)” (M)

In contrast to the weak gender results for word use and the limited results for CMC acts, the content analysis results for message tone show clearer gender preferences (Figure 2). Teenage boys tend to use more aggressive (male 10%/female 4%) and flirtatious tones (male 26%/female 12%). In contrast, female users much more often adopt a friendly tone in their messages (male 20%/female 39%). Sexual message tone was used slightly more in male (13%) than in female (10%) messages.

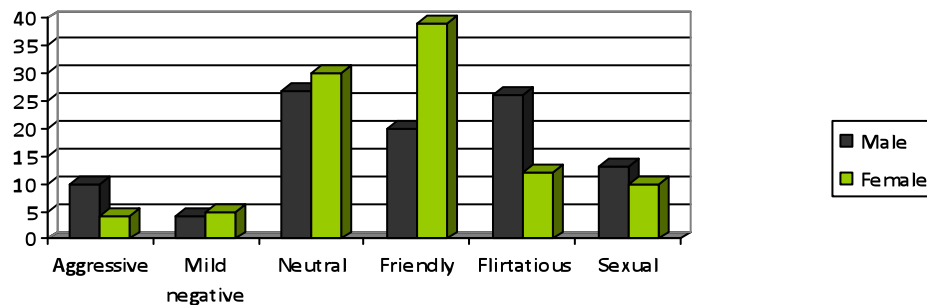


Figure 2. Message tone (results normalized as percentages of all messages per gender)

Examples of the tone categories showing gender differences⁵ are given in (2).

(2)

Aggressive: “Wha the fuccc?” (M)

Sexual: “any girls like blackk and 9 inches?” (M)

Flirtatious: “any hotties want to chat??” (M)

Friendly: “how do u feel?” (F)

For the last part of the analysis, 200 images from a single site were analyzed. Only 21 (10.5%) of users did not have a profile picture; 14% of male users chose not to represent themselves with an image, as compared to 7% of female users. The relative reticence of boys to show themselves is reflected in the social distances of the pictures that each gender chose to display. Analysis of the profiles that had pictures revealed that female users are more likely to choose images of themselves at intimate (male 1%, female 11%) and close personal (male 30%, female 52%) distances. In contrast, male users preferred far personal (male 40%, female 20%) distance by a large margin.

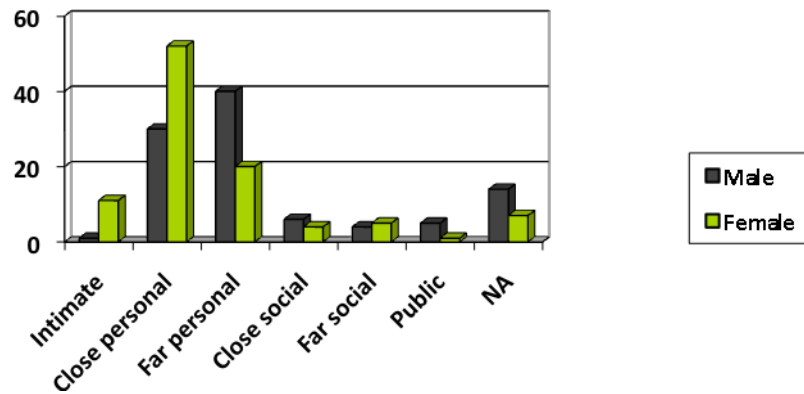


Figure 3. Social distance (results normalized as percentages of all images per gender)

The behavior analysis also showed strongly gender-skewed results (Figure 4).

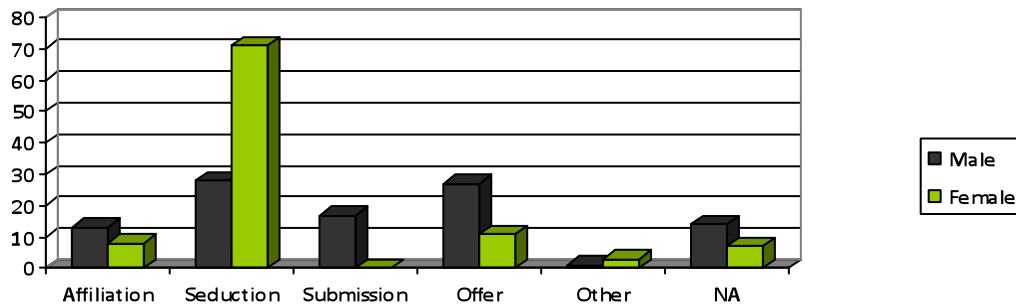


Figure 4. Behavior (results normalized as percentages of all images per gender)

The overwhelming majority of teenage girls (71%) chose to present themselves in pictures with seductive behavior—head tilted, body angled, eyes looking up or sideways at the viewer—, in comparison with 28% of male users who chose to present themselves that way. Males were more likely to choose pictures of themselves depicting behavior classified as offer (looking away in the distance; 27%), demand/submission (looking down at the viewer; 17%) and demand/affiliation (looking straight at the viewer; 13%).

Finally, most of the teens tend to present themselves in demure dress (male 66%, female 45%). However, one third of all girls (32%) chose suggestive dress, and 8% chose pictures in which they were partially clad, as compared to 15% of male users whose pictures showed their nude upper body. Since a male showing his upper body is not socially equivalent to a female showing her breasts, the suggestive and partially clad categories can be combined to compare more accurately across genders; doing so still reveals that more girls than boys chose pictures of themselves revealingly (un)dressed.

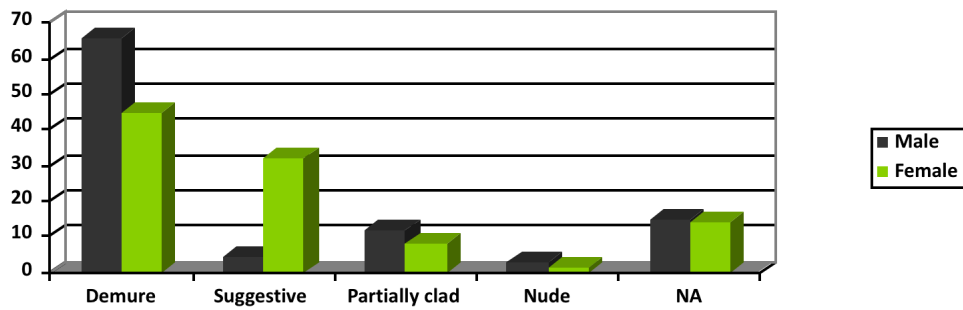
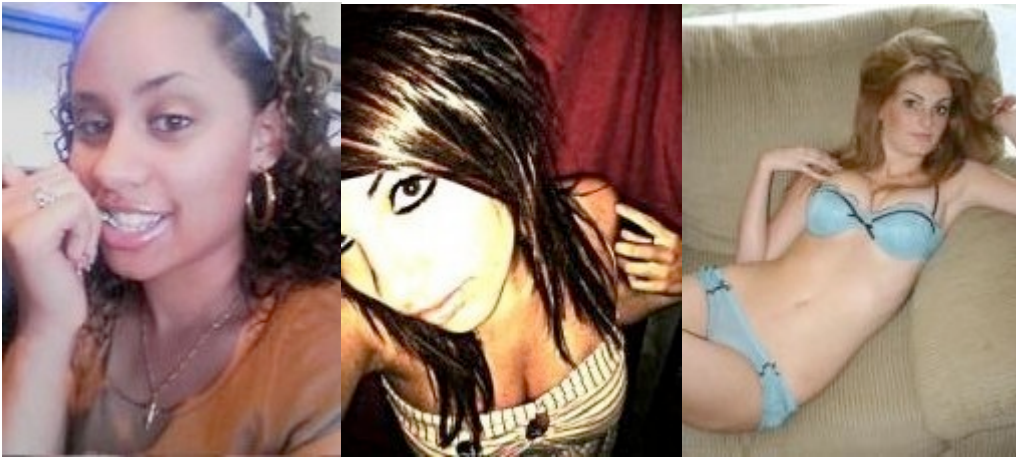


Figure 5. Dress (results normalized as percentages of all images per gender)

Some examples of profile photos illustrating the major gender patterns described above are shown in (3) and (4).⁶

(3) Girls: seductive behavior with a) demure, b) suggestive, and c) revealing dress

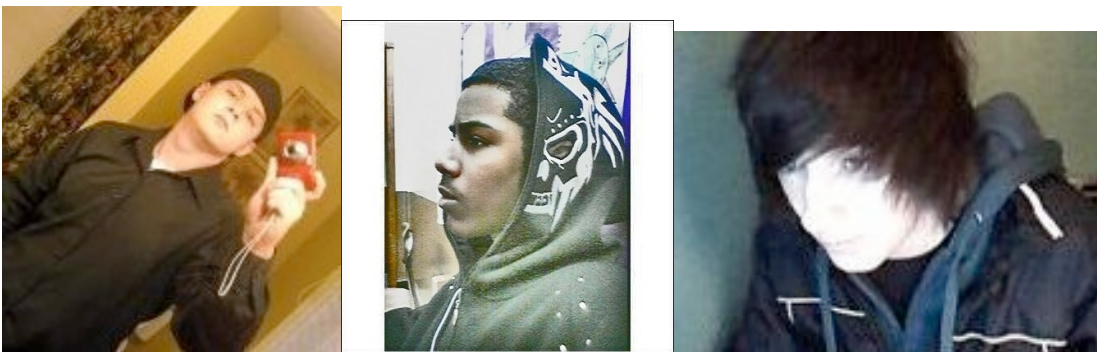


a)

b)

c)

(4) Boys: Demure dress with a) demand/submission, b) offer, and c) seductive behavior



a)

b)

c)

Discussion

The analysis of the teen chat site data reveals that gender differences are present at all four levels of communication, but to varying degrees. The findings are discussed in relation to the research hypotheses in what follows.

We first predicted that few, if any, gender differences would be found on the level of individual word choice in our sample of five teen chat sites. In fact, some tendencies related to gender were found, some of which are consistent with previous research (e.g., males using more articles; females expressing more emotion) and others of which are not (e.g., males using more 1st-person pronouns). Moreover, the results were variable across chat samples, and the chat data as a whole differ more from the formal and personal text data provided by the LIWC analysis tool as points of comparison than males and females in the chat differ from each other. Overall, then, we consider gender differences as a result of the LIWC analysis to be weak and H1 to be supported.

Our second hypothesis posited that differences would be found on the discourse-pragmatic level; specifically, that boys would use more assertive and active language, while girls would use language that is more cooperative and accommodating. The CMC act analysis provided limited support for this prediction, in that boys were found to use more manipulative acts and girls more reactive acts. However, both genders made claims (subjective assertions) about equally, and other acts were used infrequently and/or showed little gender difference. Moreover, the act results were also quite variable across samples, suggesting that what participants in a particular chat session happened to be talking about at the time we sampled our data conditioned the choice of verbal acts as much as gender did. Therefore, we consider H2 to be only weakly supported.

However, the participants in the chat were all engaged in the same activity, and both genders were communicating on the same topic within any given chat sample. Thus the results of the linguistic features and CMC act analyses are perhaps not surprising in light of the findings of previous research, such as Herring and Paolillo's (2006) study of gender and genre variations in weblogs, which found that gender differences were least evident on the linguistic level, especially when participants engaged in discourse of the same genre on the same topic.

Our third hypothesis predicted that stylistic gender differences would be found in the chat messages; specifically, that boys would tend to adopt a more flirtatious and overtly sexual tone, while girls' communication would be less sexual and more friendly. This hypothesis was strongly supported, with the exception of sexual messages, which were contributed by boys only slightly more often than by girls. However, boys were decidedly more flirtatious—a finding also supported by their higher use of 'invite' CMC acts—consistent with the gender norm of males as the initiators of heterosexual relations. Girls were also decidedly less flirtatious and more friendly, although girls sent flirtatious messages, too, in keeping with the overall flirtatious tone of some of the chat rooms.

All of the hypotheses related to images were supported. Gender differences were found in self-representation in profile photographs in both dress and behavior, with girls presenting themselves seductively in posture, gaze, and clothing. In contrast, boys varied little in their dress, but adopted a greater range of behaviors in their profile photos, include presenting themselves as remote (offer) and dominant (demand/submission). In addition, gender differences were found for the social distance of the subject from the viewer of the images, although we did not advance a hypothesis about social distance, due to the lack of previous research examining this variable in relation to gender. However, the fact that males more often showed themselves at a distance from the viewer, combined with the greater number of male profiles that contained no photo, can be interpreted in light of past research by Scheidt (2004), which found that male avatars tended to look withdrawn—to be hiding, even, in their hair and clothes. Overall, the image findings in the present study conform well with Scheidt's earlier observations about avatars in graphical teen chat rooms.

At the same time, a not insignificant number (15%) of all male profiles depicted the user with a nude upper body. This appears to support a trend identified by Manago et al. (2008), who in their study of MySpace profiles observed an “increasing pressure for men to display their physical attractiveness”. Whether the number of male profile pictures that display partial nudity constitutes an “increase,” however, cannot be determined through comparison, because Manago et al. did not provide frequencies of different self-representations in their study, which was based on focus groups.

Finally, it is important to acknowledge the variation in results across the sample sites. Although our initial assumption in sampling teen chat sites was that the sites would show more similarities than differences, and chat site was not a dimension of variation in our hypotheses, the percentages of words, CMC acts, and tone categories were observed to vary across the five chat sites in the sample (see Appendix, Tables 1 and 2). In part, this is because of the different purposes the sites serve. Some sites seem to be devoted primarily to social chat, as evidenced by the larger variety and more even distribution of CMC acts in their chat rooms (e.g., teenchat.com, chitchatting.com). Others (e.g., teenspot.com, 321chat.com) tend to function as a starting point for private or video chat interactions. This is evident from the larger number of invitations and directives, as opposed to other CMC acts, as well as an overall more flirtatious tone that characterizes the chat on these sites. These differences in site purpose, along with variation conditioned by the local topic of discourse, should be taken into account in future research, particularly given the evidence from past research (e.g., Herring & Paolillo, 2006) that genre and topic can confound gender differences in online interaction.

Conclusion

This paper began by asking to what extent male and female teenagers communicate differently from one another on contemporary, multimodal teen chat sites—and more broadly, whether the extent and nature of gender differences in their communication have changed since the early findings on gender and CMC reported in the 1990s. Despite some evidence of non-traditional gendered behavior in the recent literature (females less passive: Huffaker & Calvert, 2005; Subrahmanyam et al., 2004; male bodies more

sexualized: Manago et al., 2008) or no gender differences (e.g., Gross, 2004), the findings of the present study are overall more in tune with the bulk of traditional findings than supportive of these non-traditional results. That is, young females in 2010 still tend to present themselves as emotional, friendly, good listeners (reactive), sexually available, and eager to please males (cf. Magnuson & Dundes, 2008), while young males appear more assertive, manipulative, initiating, and visually dominant, while at the same time more distant.

While these findings are not new, per se, they deserve to be reported, both to update the scholarly record and to counter the ongoing tendency for people to imagine that gender differences are continuously receding with each subsequent generation. Rather, the results of this study suggest that gender differentiation in communication at all levels serves useful purposes for adolescents and persists for that reason. The search for partners is an important adolescent activity (Smahel & Subrahmanyam, 2007), and symbolic gender differentiation via language and images can heighten mutual attractiveness, especially in virtual (non-physical) environments such as chatrooms. More generally, teenagers awaken out of childhood to the realization that they are social and sexual creatures within a gendered society, who must learn to manifest aspects of their identity appropriately in relation to other social and sexual creatures. Eckert (1996) has claimed that gender identities are complementary and co-constructed within a default heterosexual marketplace, and Herring and Zelenkauskaitė (2009) have argued that public computer-mediated environments can function as such marketplaces. In the teen chat marketplace studied here, gender differentiation appears to be an ongoing, collaborative enterprise in which both boys and girls participate. If this is the case, it would be shortsighted to view the communicative reproduction of gender binaries solely as indicating unequal power relations, as has been done explicitly or implicitly in much past gender (including gender and CMC) research. Real power dimensions underlie the patterns, which can be read as evidence of socialization (or performances, if one prefers) of males as dominant and in control and females as accommodating and pleasing to males. At the same time, the evidence of continuously reproduced gender patterns should lead researchers to acknowledge those patterns and seek to understand them as the users themselves intend them, in a pro-social light.

We also raised questions at the outset of the paper about the communicative levels at which gender differentiation takes place in teen chat rooms, and found that it is most obvious at the levels of visual representations (and not just because males and females are physically different) and overall communication style. Lower-level language features, such as word choice and speech acts, seem to have other functions aside from signaling gender identity in English chat rooms; specifically, they are sensitive to topic and communicative activity. However, gender permeates their preferential usage to varying degrees, indicating a weak preference in English teen chat for gender signaling even at the utterance and word level.

Finally, we asked what the effect of changing technological affordances is on gender expression in multimedia, convergent media sites. Specifically, since anonymity was claimed in previous research to encourage the breakdown of traditional gendered

forms of expression (e.g., Danet, 1998), we wondered whether the availability of photographs of users would make gender more salient. Profile pictures are a relatively new feature on chat sites, but they have been embraced by users; 90.5% of all randomly selected profiles in the present study contained an image of the user. While comparative historical data are lacking to determine relative degrees of salience, it is certainly the case the gender is visually salient in the present study through choice of profile pictures. Moreover, although stand-alone chat is decreasing in usage among teens (Pew Internet and American Life, 2007), the fact that chat protocols are increasingly being integrated in social network sites suggests that they will continue to be important environments in which young people socialize, and thus, that the patterns identified in this study will continue to be relevant for some time.

The limitations of this study include the fact that the profile images were obtained from a single chat site, for reasons explained in the Methodology section. A larger sample of images might have shown cross-site variation that could have yielded insight, just as the cross-site variations in verbal behaviors suggested further directions of inquiry. Moreover, this study did not analyze all of the variables claimed in previous studies to show gender differences; for instance, we did not differentiate between implicit and explicit sexual messages, as did Subrahmanyam et al. (2006). More fine-grained analytical differentiation might have shown further gender differences, or the lack thereof. Perhaps most important, this study was not designed to test the effect of individual chat site on any of the communicative features, yet cross-site variation was observed to occur. Future research should be structured to control for chat site as a potentially predictive variable, for example by collecting larger samples of data and conducting multivariate statistical analyses.

Although teen chat sites may appear to be an outmoded form of CMC, surpassed in popularity among adolescents by IM and social network sites (Pew Internet and American Life, 2007), this study found that they are an active and evolving genre. The trend towards reduction of anonymity through profiles and photographs clearly affects the ways in which teenagers use online chat environments for communication and self-representation, and as such they present a legitimate field for future research.

Notes

¹ Multi-User Dungeon or Multi-User Dimension, a text-based virtual reality environment in which communication is via synchronous chat.

² Assuming that the photos, avatars, and nicknames accurately represent the users' real-life genders. For discussion of this methodological point, see, e.g., Herring (2003).

³ Permission was obtained from the authors' institutional review board to collect and analyze these data, which are publicly available on the Web. Nonetheless, in showing examples of images to illustrate our analyses, only images from subjects whose profiles state that they are 18 or 19 years old are used.

⁴ "lmao" = laughing my ass off; "omggg" = Oh, my god ('g's repeated for emphasis).

⁵ The other two tone categories—mild negative (e.g., "damn i have only one..." [F]) and neutral ("so I am rich" [M])—do not appear to differ in use appreciably by gender.

⁶ All image examples are from profiles stating that the user is 18 or 19 years old.

References

- Argamon, S., Koppel, M., Fine, J., & Shimoni, A. R. (2003). Gender, genre, and writing style in formal written texts. *Text*, 23(3), 321-347.
- Bach, K., & Hamish, R. M. (1979). *Linguistic communication and speech acts*. Cambridge, MA: MIT Press.
- Bell, P. (2001). Content analysis of visual images. In T. van Leeuwen & C. Jewitt (Eds.), *Handbook of visual analysis* (pp. 10-34). London: Sage.
- boyd, d., (2008). Why youth heart social network sites: The role of networked publics in teenage social life. In D. Buckingham (Ed.), *Youth, identity and digital media* (pp. 119-142). Cambridge, MA: MIT Press.
- Cherny, L. (1994). Gender differences in text-based virtual reality. In M. Bucholtz, A. Liang, & L. Sutton (Eds.), *Cultural Performances: Proceedings of the Third Berkeley Women and Language Conference*. Berkeley, CA: Berkeley Women and Language Group.
- Coates, J. (1993). *Women, men and language*. London: Longman.
- Danet, B. (1998). Text as mask: Gender and identity on the Internet. In S. G. Jones (Ed.), *Cybersociety 2.0* (pp. 129-158). Thousand Oaks, CA: Sage.
- Goffman, E. (1979). *Gender advertisements*. London: Macmillan.
- Gross, E. F. (2004). Adolescent Internet use: What we expect, what teens report. *Applied Developmental Psychology*, 25, 633-649.
- Guiller, J., & Durdell, A. (2007). Students' linguistic behavior in online discussion groups: Does gender matter? *Computers in Human Behavior*, 23(5), 2240-2255.
- Eckert, P. (1996). Vowels and nail polish: The emergence of linguistic style in the preadolescent heterosexual marketplace. In N. Warner, J. Ahlers, L. Bilmes, M. Oliver, S. Wertheim, & M. Chen (Eds.), *Gender and Belief Systems: Proceedings of the Fourth Berkeley Women & Language Conference* (pp. 183-190). Berkeley, CA: Berkeley Women & Language Group.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. Oxford, UK: Norton.
- Francis, G., & Hunston, S. (1992). Analysing everyday conversation. In M. Coulthard (Ed.), *Advances in spoken discourse analysis* (pp. 1-34). London: Routledge.
- Hall, E. (1966). *The hidden dimension*. New York: Doubleday.
- Herring, S. C. (1992). *Gender and participation in computer-mediated linguistic discourse*. Washington, D.C.: ERIC Clearinghouse on Languages and Linguistics, document ED345552. Retrieved February 17, 2010 from <http://ella.slis.indiana.edu/~herring/participation.1992.pdf>
- Herring, S. C. (1993). Gender and democracy in computer-mediated communication. *Electronic Journal of Communication*, 3(2). Retrieved February 17, 2010 from <http://ella.slis.indiana.edu/~herring/ejc.txt>

- Herring, S. C. (1994). Politeness in computer culture: Why women thank and men flame. In: *Cultural Performances: Proceedings of the Third Berkeley Women and Language Conference* (pp. 278-294). Berkeley, CA: Berkeley Women and Language Group.
- Herring, S. C. (2003). Gender and power in online communication. In J. Holmes & M. Meyerhoff (Eds.), *The handbook of language and gender* (pp. 202-228). Oxford: Blackwell Publishers.
- Herring, S. C. (2007). A faceted classification scheme for computer-mediated discourse. *Language@Internet*, 4, article 1. Retrieved February 17, 2010 from <http://www.languageatinternet.de/articles/2007/761>
- Herring, S. C., Das, A., & Penumarthy, S. (2005). *CMC act taxonomy*. Retrieved February 17, 2010 from <http://www.slis.indiana.edu/faculty/herring/cmc.acts.html>
- Herring, S. C., & Paolillo, J. C., (2006). Gender and genre variation in weblogs. *Journal of Sociolinguistics*, 10(4), 439-459.
- Herring, S. C., & Zelenkauskaitė, A. (2009). Symbolic capital in a virtual heterosexual market: Abbreviation and insertion in Italian iTV SMS. *Written Communication*, 26(1), 5-31.
- Huffaker, D. A., & Calvert, S. L. (2005). Gender, identity, and language use in teenage blogs. *Journal of Computer-Mediated Communication*, 10(2). Retrieved February 17, 2010 from <http://jcmc.indiana.edu/vol10/issue2/huffaker.html>
- Koch, S. C., Mueller, B., Kruse, L., & Zumbach, J. (2005). Constructing gender in chat groups. *Sex Roles*, 53(1/2), 29-41.
- Kress, G., & van Leeuwen, T. (1996). *Reading images: The grammar of visual design*. New York: Routledge.
- Lambiase, J. (2003). Codes of online sexuality: Celebrity, gender and marketing on the Web. *Sexuality & Culture*, 7(3), 57-78.
- Levinson, S. C. (1983). *Pragmatics*. Cambridge, UK: Cambridge University Press.
- Magnuson, M. J., & Dundes, L. (2008). Gender differences in “social portraits” reflected in MySpace Profiles. *CyberPsychology & Behavior*, 11(2), 239-241.
- Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology*, 29(6), 446-458.
- Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). Linguistic inquiry and word count (LIWC): LIWC 2001. Mahwah, NJ: Erlbaum.
- Pennebaker, J. W., Mehl, M. R., & Niederhoffer, K. G. (2003). Psychological aspects of natural language use: Our words, our selves. *Annual Review of Psychology*, 54(1), 547-577.
- Pew Internet and American Life Project (2007). Teens and social media. *Pew Internet and American Life Project*. Retrieved February 16, 2010 from

http://www.pewinternet.org/~media/Files/Reports/2007/PIP_Teens_Social_Media_Final.pdf.pdf

- Rodino, M. (1997). Breaking out of binaries: Reconceptualizing gender and its relationship to language in computer-mediated communication. *Journal of Computer-Mediated Communication*, 3(3). Retrieved February 17, 2010 from <http://jcmc.indiana.edu/vol3/issue3/rodino.html>
- Scheidt, L. A. (2004, May). *Buxom girls and boys in baseball hats: Adolescent avatars in graphical chat spaces*. Paper presented at the 54th Conference of the International Communication Association, New Orleans, LA. Retrieved February 17, 2010 from http://loisscheidt.com/working_papers_archive/Buxom_girls_and_boys_in_baseball_hats.pdf
- Selfe, C. L., & Meyer, P. R. (1991). Testing claims for on-line conferences. *Written Communication*, 8(2), 163-192.
- Smahel, D., & Subrahmanyam, K. (2007). "Any girls want to chat press 911:?" Partner selection in monitored and unmonitored teen chat rooms, *CyberPsychology & Behavior*, 10(3), 346-353.
- Soley, L. C., & Reid, L. N. (1988). Taking it off: Are models in magazine ads wearing less? *Journalism and Mass Communication Quarterly*, 65(4), 960-966.
- Subrahmanyam, K., Greenfield, P. M., & Tynes, B. (2004). Constructing sexuality and identity in an online teen chat room. *Journal of Applied Developmental Psychology*, 25(6), 651-666.
- Subrahmanyam, K., Smahel D., & Greenfield, P.M. (2006). Connecting developmental constructions to the Internet: Identity presentation and sexual exploration in online teen chat rooms. *Developmental Psychology*, 42(3), 395-406.
- Thewall, M., Wilkinson, D. & Uppal, S. (2009). Data mining emotion in social network communication: Gender differences in MySpace. Preprint of an article accepted for publication in the *Journal of the American Society for Information Science and Technology*.
- Thomson, R., & Murachver, T. (2001). Predicting gender from electronic discourse. *British Journal of Social Psychology*, 40, 193-208.
- Twenge, J. M. (1997). Changes in masculine and feminine traits over time: A meta-analysis. *Sex Roles*, 36, 305-325.

Appendix

Table 1. Key linguistic features (LIWC)

	Self - references (I, me, my)	Social words	Positive emotions	Negative emotions	Overall cognitive words	Articles (a, an, the)	Big words (>6 letters)
Formal texts (reference provided by LIWC)							
	4.2	8.0	2.6	1.6	5.4	7.2	19.6
Personal texts (reference provided by LIWC)							
	11.4	9.5	2.7	2.6	7.8	5	13.1
teenchat.com							
male (89)	5.09	12.33	2.35	2.15	4.89	5.09	10.76
female (77)	2.58	10.08	1.55	5.17	4.39	2.58	7.75
teenspot.com							
male (147)	8.51	12.08	1.5	1.41	2.77	3.2	11.75
female (48)	7.62	11.71	3.95	1.97	4.8	3.81	11.28
321teenchat							
male (133)	6.91	10.36	2.51	2.83	2.83	2.51	10.2
female (61)	3.56	10.32	3.91	2.14	3.2	2.49	13.17
freechatroom.org							
male(115)	5.11	12.88	3.27	2.45	4.09	3.89	8.38
female (83)	6.44	8.28	0.92	4.29	2.76	3.68	7.06
chitchatting.com							
male (129)	11	11.25	4.5	1.75	5.25	3.25	9
female (70)	6.03	7.33	5.17	1.72	5.17	3.02	6.47
total							
male (614)	7.68	11.86	2.26	1.87	3.43	3.41	10.73
female (339)	5.63	10.08	3.1	3	4.19	3.26	9.56

Table 2. CMC Acts

	inquire	request	invite	claim	elaborate	reject	react	direct	repair	apologize	summon	greet	inform	desire	accept
teenchat.com															
Male (89)	8 (9%)	0 (0%)	14 (16%)	18 (20%)	3 (4%)	1 (1%)	11 (12%)	2 (2%)	2 (2%)	0 (0%)	0 (0%)	17 (19%)	12 (14%)	1 (1%)	0 (0%)
Female (77)	9 (12%)	0 (0%)	12 (15%)	12 (15%)	3 (4%)	3 (4%)	14 (18%)	6 (8%)	0 (0%)	2 (3%)	1 (1%)	6 (8%)	9 (12%)	0 (0%)	0 (0%)
NA (34)	6 (18%)	0 (0%)	0 (0%)	6 (18%)	2 (6%)	3 (9%)	7 (21%)	3 (9%)	0 (0%)	0 (0%)	0 (0%)	2 (6%)	3 (9%)	0 (0%)	1 (3%)
teenspot.com															
Male (147)	18 (12%)	0 (0%)	101 (70%)	4 (3%)	0 (0%)	0 (0%)	3 (2%)	14 (10%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (1%)	1 (1%)	1 (1%)
Female (48)	2 (4%)	1 (2%)	27 (56%)	6 (13%)	0 (0%)	2 (4%)	3 (6%)	2 (4%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	4 (9%)	0 (0%)	1 (2%)
NA (5)	0 (0%)	0 (0%)	0 (0%)	3 (60%)	1 (20%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (20%)	0 (0%)
321 teenchat.com															
Male (133)	6 (4%)	0 (0%)	39 (29%)	25 (19%)	13 (10%)	5 (4%)	17 (13%)	8 (6%)	0 (0%)	1 (1%)	2 (1%)	5 (4%)	11 (8%)	1 (1%)	0 (0%)
Female (61)	10 (17%)	0 (0%)	13 (22%)	7 (12%)	0 (0%)	3 (5%)	9 (15%)	4 (7%)	0 (0%)	0 (0%)	1 (2%)	5 (8%)	6 (10%)	0 (0%)	1 (2%)
NA (6)	2 (33%)	0 (0%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	0 (0%)	2 (33%)	0 (0%)	0 (0%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	0 (0%)
free-chat-rooms.org															
Male (115)	21 (18%)	0 (0%)	9 (8%)	32 (28%)	7 (6%)	1 (1%)	16 (14%)	7 (6%)	1 (1%)	0 (0%)	4 (3%)	3 (3%)	9 (8%)	0 (0%)	5 (4%)
Female (83)	4 (5%)	0 (0%)	3 (4%)	18 (21%)	18 (21%)	5 (6%)	17 (20%)	2 (2%)	0 (0%)	0 (0%)	3 (4%)	2 (2%)	7 (8%)	1 (1%)	3 (4%)
NA (2)	0 (0%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)
chitchatting.com															
Male (129)	7 (6%)	0 (0%)	3 (2%)	25 (19%)	12 (9%)	8 (6%)	30 (23%)	11 (9%)	0 (0%)	0 (0%)	5 (4%)	10 (8%)	10 (8%)	5 (4%)	3 (2%)
Female (70)	16 (24%)	2 (3%)	0 (0%)	14 (21%)	4 (6%)	1 (1%)	15 (22%)	3 (4%)	1 (1%)	0 (0%)	2 (3%)	6 (9%)	0 (0%)	0 (0%)	4 (6%)
NA (1)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)
Male (614)	60 (10%)	0 (0%)	166 (27%)	104 (17%)	35 (6%)	15 (2%)	77 (13%)	42 (7%)	3 (1%)	1 (0.1%)	11 (2%)	35 (6%)	44 (7%)	8 (1%)	9 (0.1%)
Female (339)	41 (12%)	3 (1%)	55 (16%)	57 (17%)	25 (8%)	14 (4%)	58 (17%)	17 (5%)	1 (0.5%)	2 (1%)	7 (2%)	19 (6%)	26 (8%)	1 (0.5%)	9 (3%)
NA (47)	8 (17%)	0 (0%)	1 (2%)	10 (21%)	3 (6%)	3 (6%)	7 (15%)	5 (11%)	0 (0%)	0 (0%)	0 (0%)	5 (11%)	3 (6%)	1 (2%)	1 (2%)