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The effect of emoticons in simplex and complex task-oriented communication: An empirical study of instant messaging

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ABSTRACT

Many studies have shed light on general computer-mediated communication, instant messaging (IM), and emotion or emoticons, but little is known specifically about the impacts of emoticons in task-oriented IM communication in the workplace. Therefore, the current study addresses this issue by conducting an exploratory experiment to (1) categorize workplace IM messages into coherent groups, (2) identify the most commonly used emoticons (emblems) for expressing positive, negative, and neutral emotions in the case company, (3) test the differences in the emotional effects of the received text messages with and without emoticons on the reader/s, and (4) examine the intention to use emoticons in IM in the workplace. The results showed that (1) negative emoticons could cause a negative effect in both simplex and complex task-oriented communication, (2) positive emoticons only created a positive effect in complex communication and for female employees in simplex communication, and (3) there is no significant difference between task-oriented messages with or without neutral emoticon. Furthermore, the intention of using emoticons was not statistically significant in terms of gender, but it has a higher tendency on female employees. The corresponding suggestions provided by this research may help increase our understanding on the effect of emoticon use in IM in the workplace.

1. Introduction

Since the introduction and consequent booming of the Internet as well as the emergence of different electronic communication channels, we have witnessed an enormous increase in computer-mediated communication (CMC) such as asynchronous (e.g., e-mail) and synchronous CMC (e.g., instant messaging (IM)). More and more interactions are taking place via the chat tool; for example, many people use IM to chat privately as well as professionally. Furthermore, IM services also help maintain relationships among friends and colleagues in different locations.

CMC has become so common in people's daily lives that it raises a major question on how different online communication is from face-to-face (F2F) communication. For example, do people chat in IM in the same manner they would in live/actual interactions? Are conversations presented in different ways, and do they trigger different emotions or effects in CMC? Some studies argued that CMC is a cold and unfriendly medium where the emotions are very difficult to express (Sproull & Kiesler, 1986), while other studies declared that the differences between CMC and F2F are not that major (Walther, Anderson, & Park, 1994). For instance, Sannomiya and Kawaguchi (1999) investigated the cognitive characteristics of CMC and F2F communication, and suggested that F2F communication might support productive discussion for the creation of ideas, while CMC supports in-depth discussion for the examination of ideas.

When discussing the task-related function of IM, it is interesting to know whether the emotions involved in CMC and F2F are any different. It has been argued that the communication of emotions is more difficult in CMC than in F2F. Burgoon, Buller, and Woodall (1996) specifically concluded that non-verbal behavior pre-dominates the effects of language content in most conditions. What may then appear in IM other than pure text? Let us assume the following scenario: "One day, when Ted was concentrating on his morning work, his IM windows prompted an instant message from Monica. '... what do you mean?', Ted was very angry at that time because of Monica's rude act. However, he tried to figure out her true intention and calmed down himself first by returning her a message together with a happy emoticon – ☺. Instantly, Monica returned a text message together with a happy emoticon too. Thus, Ted had a different emotion and a better mood as compared to

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earlier." This scenario tells us that emoticons indeed change somehow the emotion effect between IM users in the workplace. However, researchers have rarely studied the effect of the emoticons of IM in the workplace, which is a concern since emoticons have been widely used in the workplace nowadays.

Emoticons are defined as a means to express emotion, hence its name "emotional icon". Their actual function hinges on the definition of the word emotion. Emoticons can be considered a creative and visually salient way to add expression to an otherwise strictly text-based form. Some studies also showed that females used more frequent non-verbal cues in CMC. Therefore, two primary research questions related to emoticons are presented as follows: First, What are the effects of emoticons on task-oriented messages in IM in the workplace? Second, Is there any gender difference in emoticon use in IM in the workplace? To conduct a case-study experiment in this study, two additional research questions are examined: What types of IM messages exist in the case company? How do the employees in the case company perceive the use of IM in the workplace? The research design will address these four research questions following the literature review.

2. Background literature

2.1. CMC in the workplace and IM

Sproull and Kiesler (1986) argued that e-mail in the workplace does not simply speed up the exchange of information but also leads to the exchange of new information. In a field study in a Fortune 500 company, e-mail communication was examined at all levels of the organization, and it was found that much of the information conveyed through e-mail was data that would not have been conveyed through another medium.

IM, another popular CMC tool next to e-mail, appears to be progressively used in the office. To facilitate convenience in communication and the advantage of efficiency, employees use IM to arrange meetings, discuss projects, and greet people. For example, heavy IM users and frequent IM partners mainly use it to work together to discuss a broad range of topics via many fast-paced interactions everyday, each with many short turns and much threading and multitasking. Light users and occasional pairs generally use IM to coordinate scheduling via fewer discussions everyday. In a study on IM usage in the workplace, Nardi, Whittaker, and Bradner (2000) concluded that IM is used primarily for four functions: (1) quick questions and clarifications, (2) coordination and scheduling of work tasks, (3) coordination of impromptu social meetings, and (4) keeping in touch with friends and family. Variations of these functions are frequently mentioned in other studies (Connell, Mendelsohn, Robins, & Canny, 2001; Grinter & Palen, 2002; Mahowald & Levitt, 2000; Milewski & Smith, 2000; Rhinelander, 2000).

The features of IM include the following: (1) IM conversations are brief, (2) media switching is prevalent, and (3) multitasking is common while conversing in IM (Connell et al., 2001; Grinter & Palen, 2002; Mahowald & Levitt, 2000; Milewski & Smith, 2000; Nardi et al., 2000; Rhinelander, 2000). Robb (2001) also argued that IM seems to be steadily advancing into the office environment whether the financial industry is ready for it or not. IM allows its users to chat online, thus offering real-time access to multiple associates. Wang's (2005) studies showed that colleagues and superiors are the main objects when IM is used within organizations. The presence of IM will likely increase its acceptance as a business communication tool. In the workplace, one of CMC's characteristics is task-oriented interactions (Connolly, Jessup, & Valacich, 1990). Friendship development and personalized communication are more important for IM as a socialization tool, and they are the factors that make IM useful as a socialization tool (Huang & Yen, 2003). However, they also argued that IM could be for both social and task-related interactions. The social aspect of IM is extensive, so the maintenance of social relationships has been found to be indeed an essential function of online communication networks. However, unlike F2F social groups in which one can passively participate just by being present, online communication networks somehow require active participation if one is to receive social benefits (Wellman, 2001).

2.2. Emotion and emoticons – the visible cue

Derks, Fischer, and Bos (2008) argued that there is no indication showing that CMC is a less emotional or less personally involving medium than F2F. On the contrary, they concluded that both online and offline communication are surprisingly similar, and if their differences are to be identified, CMC showed more frequent and explicit emotion communication than F2F. This is indirectly supported by Kato, Sugimura, and Akahori's (2001) conclusion that affective traits influence affective states in e-mail communication in their exploration of the affective aspect of CMC prior to the comparison between CMC and F2F.

Kato, Kato, and Akahori (2007) also showed that there is a tendency for unpleasant emotions, such as negative emoticons of anger and anxiety, to increase when the emotional cues transmitted are low, which has been proven to cause some misunderstanding in the e-mail communication between senders and receivers. Spears and Lea (1992) also proposed that the norms and values associated with being online may promote uninhibited behaviors such as flaming. This idea was tested by Orenga Castella, Zornoza, Prieto Alonso, and Peiro' Silla (2000), and they found that negative emotion expression appeared more often in CMC than in F2F, suggesting that it is the lack of visible cues that may reinforce an experience of anonymity and explain the results.

Similar to non-verbal cues in F2F, emoticons also help accentuate or emphasize a tone or meaning during message creation and interpretation (Crystal, 2001; Rezabek & Cochenour, 1998). Furthermore, they help communicate more clearly a current mood or mental state of the author (Constantin, Kalyanaraman, Stavrositu, & Wagoner, 2002), thereby also providing additional social cues about this person (Thompson & Foulger, 1996). Thus, emoticons serve the function of clarifying textual messages which is similar to non-verbal displays in F2F (Derks, Bos, & von Grumbkow, 2008; Walther & D'Addario, 2001). Some studies (Hwang, 2007; Kato et al., 2007; Lewis & Fabos, 2005) found that the use of emoticons in IM is popular via analyzing message logs or observing prompting windows. Especially, facial expressions have even greater effects than vocal and spatial non-verbal cues, which are important in judging positivity because receivers connect a smile with positivity, a connection that has no analogue in the body and the voice.

In particular, Huffaker and Calvert's (2005) study implied that individuals at least feel the need to express some of their emotions with short symbols rather than text in weblogs and other chat devices such as MSN. This is supported by Rivera, Cooke, and Bauhs (1996), who said that subjects who used emoticons are more satisfied with the system than those subjects who had no access to emoticons. Therefore, it is obvious that emoticons have become commonplace in CMC, and they have clearly found their way into the vocabulary and tools of the computer-using world.

2.3. Gender difference

With regard to gender difference in CMC, various authors have suggested that women's more frequent non-verbal displays, especially smiling, could be reflected in the more frequent use of emoticons (Lee, 2003; Witmer & Katzman, 1997). However, Walther and

D'Addario (2001) argued that there are no gender differences in the tendency to send emoticons with e-mail messages of their own creation, which is contrary to the findings of Witmer and Katzman (1997) and Wolf (2000). Savicki and Kelley (2000) found that women in female-only groups have a more emotional style because of their repeated and plain self-disclosure. On one hand, Lee (2003) studied gender differences in instant messaging and found that men rarely used emoticons in conversations with other men, but used more emoticons when interacting with women. For women, there is no difference in the use of emoticons in relation to their interaction collaborator: they use the same amount of emoticons in conversing with men as they do with other women (Lee, 2003). On the other hand, Huffaker and Calvert (2005) analyzed the emoticons in men's and women's blogs, and found that males posted more emoticons than females did.

Indeed, Herring (2000) found that women are "more likely to appreciate, thank, and apologize, and to be upset by violations of politeness," while men seem less concerned with graciousness and sometimes violate expected online conduct. However, Wolf 33 demonstrated that women did not use more emoticons, but they did use them in other ways. She also argued that in real life, women tend to use emoticons more frequently to communicate humor of solidarity, whereas men use them to display sarcasm.

2.4. Effect of emoticons

Lo's study (2008) concluded that when Internet users encounter pure text without emoticons, most cannot perceive the correct emotion, attitude, and intent of the sender. On the contrary, the use of visual cues together with text has been shown to create a more positive attitude than text alone (Mitchell, 1986). In particular, researchers (Godwin, 1994; Thompson & Foulger, 1996) found that an emoticon in combination with verbal "flaming" messages modified the perceived hostility of the message. However, the effects were not consistent such that the same emoticon diminished the hostility of a message showing "tension" but increased the perceived hostility of more hostile wordiness. Unfortunately, Dyer, Green, Pitts, and Millward (1995) discovered that flaming is found more often in CMC than in F2F.

Derks et al. (2008) showed that participants used more emoticons in socio-emotional contexts than in task-oriented ones. That is, facial displays are affected by social factors as well as emotions (Derks et al., 2008; Jakobs, Manstead, & Fischer, 1999; Hess, Banse, & Kappas, 1995). Some studies found that the motives for using emoticons are for expressing emotion, enhancing the verbal part of the message (act as a supporting emoticon), and expressing humor (Siegel, Dubrovsky, Kiesler, & McGuire, 1986). These studies suggest that emoticons are regularly used and function as emblems for people's feelings in a similar way as non-verbal behaviors do in F2F. Emoticons may be used to emphasize or clarify one's feelings, but they are also used to soften one's negative tone and to regulate the interaction just as smiles and frowns do in daily life.

In Walther and D'Addario's (2001) experiment of three common emoticons on message interpretations, the concluded that emoticons' contributions were outweighed by verbal content, but a negative effect was demonstrated such that any negative message aspect – verbal or graphic – shifts the message interpretation in the direction of the negative element. However, Derks et al. (2008) argued that emoticons do influence online message interpretation and conclude that a positive message with a smile is rated more positively than a positive pure message, and a negative message with a supporting frown is more negative than a negative pure message. Nevertheless, they also argued that emoticons do not have the strength to turn around the valence of a verbal message.

3. Research methods

3.1. Objectives

Emoticons are graphical representations of facial expressions that many IM users embed in their messages. These symbols are widely known and are commonly recognized among CMC users; they are described by most observers as substitutes for non-verbal cues. According to the previous background literature, as one of the most popular CMC tools, IM has not been investigated independently in terms of its usage of visible emoticon cues in the workplace. Therefore, the inconsistent interpretation of research outcomes for general emoticon effects and gender differences in CMC requires insightful examination. Furthermore, it is highly important to understand the impact of emoticons on the emotional interpretation of a conveyed text message in the workplace context.

This study sought to explore the effect of emoticon use in IM in an experimental approach, in which the independent variables are the message type, the emoticons, and gender. The dependent variable is the interpretation of the receiver which leads to an emotional effect, with a focus limited on the impacts of facial expressions (Fridlund, Ekman, & Oster, 1987).

3.2. Sample, procedures, and measures

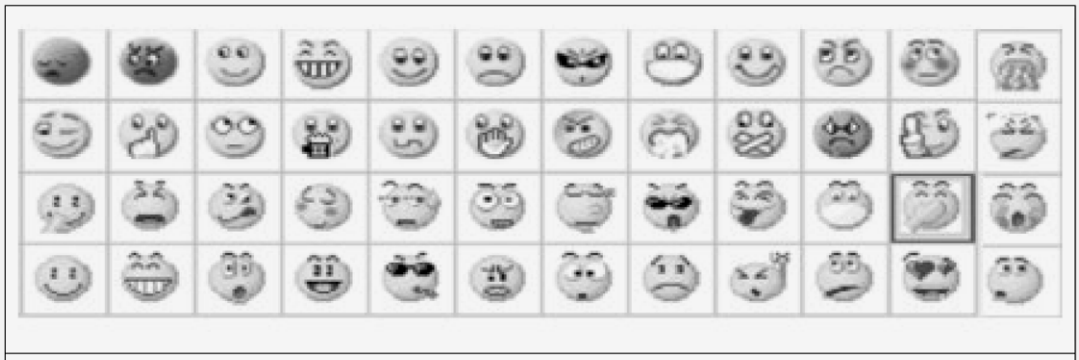
The experimental study was conducted in mid-2008 in a three-stage approach, which is described as follows:

First, the actual messages communicated in an organizational context were analyzed to categorize those messages that are most likely to appear via the IM channel. The study collected 19,885 message logs generated by 199 employees within one month in a financial institution in Taiwan. This institution introduced IM as a daily used organizational communication platform more than six years ago for most of the employees, so the employees were at least familiar with the applications of IM. Given the huge amount of data, however, only the first 30% of the complete set of collected logs (namely, 6000 messages) was analyzed. The text message of the logs can be categorized into five groups according to function: (1) discussing or coordinating tasks (complex communication) – 73%, (2) using emoticons to express emotion – 12%, (3) arranging or scheduling meetings or appointments (simplex communication) – 6%, (4) greeting (simplex communication, example: saying "hi") – 5%, and (5) linking Web site addresses and miscellaneous – 4%. As shown in the parentheses, groups 1, 3, and 4 are associated with either the complex or simplex types of communication in the workplace.

At the second stage, a survey was conducted to see how emoticons are jointly used to express emotions in the workplace context. Thirty-two volunteer employees in the aforementioned financial institution participated in this survey and were asked to choose one appropriate emoticon from 48 ones, as shown in Table 1, to express their positive, negative, and natural emotions, respectively. The emoticons that were most popular were used as experimental stimuli in the last stage of the research in order to test the impacts of the emoticons on the receivers' interpretations of the received message. Participation was voluntary. No monetary incentives or bonus credits were provided to encourage participation.

At the third stage, a $2 \times 4 \times 2$ experiment was conducted through either paper survey or web survey for really colleagues in a financial institution in Taiwan previous mentioned. Specifically, three independent variables were considered in this experiment: message type (simple and complex tasks), the emoticons (positive, negative, neutral, or no emotion), and gender (female

Table 1
Template of emoticons.



The most selected three emoticons used for "positive", "neutral" and "negative"		
positive	neutral	negative
or	or or	or
(75% voted)	(68.8% voted)	(62.5% voted)

Table 2
Demographic background of study participants.

Gender	Female	30	39.5%
	Male	46	60.5%
Age	20–29	17	22.3%
	30–39	36	47.4%
	40–49	18	23.7%
	>50	5	6.6%

and male). The study aimed to focus on task-oriented CMC in the workplace, so the emotional effect of emoticons as related to social-oriented communication such as greeting messages was not surveyed. Each of the participants received instant messages that included both (1) scheduling for a meeting which belonged to the simplex message-type scenario, and (2) discussing and requesting for discussions which belonged to the complex message-type scenario toward the topic addressed. Each text message was combined with one of the following four emoticon conditions as the baseline condition: positive, negative, neutral, or none. During the sampling plan experiment, all the participants were purposely required to answer a questionnaire which was shown in Table 3 with eight messages (Q1, Q2, ..., Q8) which assessed their emotional reactions to the test messages. They were asked to express their feelings, which were measured on a five-point Likert-type scale ranging from 1 (very unhappy) to 5 (very happy).

To ensure the content validity of the survey (Nunnally & Bernstein, 1994), a pre-test was conducted on five individuals who had ample experiences in IM use, including two executive-MBA students, two employees of a financial corporation, and one professor in the department of Information Management. The pre-test helped us improve the questions and ensure that the respondents understood each question correctly. One hundred eighty employees in the aforementioned company were invited to participate in the experiment. Seventy-six employees, of whom 40 were males and 36 were females, voluntarily responded in one month. The gender variable will also be included in the analysis of the experimental results. Given that the independent variables of gender and type of emoticon were within-subjects, all participants received

Table 3
Descriptive statistic for all, male and female participants.

Question: Once your colleague send you the following message with IM, how do you feel? (1:very unhappy, 5:very happy) Mean (standard deviation)	All ($N = 76$)	Male ($N = 46$)	Female ($N = 30$)
Q1: We have to discuss in 5 min.	3.24 (.66)	3.29 (.63)	3.17 (.70)
Q2: We have to discuss in 5 min	3.39 (.64)	3.32 (.68)	3.5 (.57)
Q3: We have to discuss in 5 min	3.31 (.64)	3.31 (.52)	3.3 (.79)
Q4: We have to discuss in 5 min	2.4 (.76)	2.47 (.77)	2.3 (.75)
Q5: Your opinion about the next step we should do?	3.38 (.57)	3.34 (.54)	3.43 (.63)
Q6: Your opinion about the next step we should do?	3.58 (.64)	3.55 (.58)	3.63 (.72)
Q7: Your opinion about the next step we should do?	3.44 (.67)	3.43 (.55)	3.47 (.82)
Q8: Your opinion about the next step we should do?	2.4 (.83)	2.46 (.75)	2.3 (.95)

both complex and simplex task-oriented messages, coupled with the four kinds of emoticon conditions.

Prior studies have varying arguments on gender differences as related to the frequency of use or tendency to use emoticons in general CMC (Lee, 2003; Walther & D'Addario, 2001; Witmer & Katzman, 1997). Some studies even showed that females are more intensive emoticon users than males. In this stage, the intention to use emoticons in IM for employees in the work place was also collected to compare with previous studies. Therefore, one more question was added to the questionnaire in order to measure employees' intention to use emoticons in IM, with the corresponding measurement scale ranging from one to five (1: very unlikely, 5: very likely).

4. Analyses and results

Table 2 presents the demographic background of the study's participants: female participants comprised about 40% and male participants about 60% of the sample, and about half of the participants were aged 30–39. The descriptive statistics of the eight experimental conditions are presented in Table 3 for both male and female participants. Analyses of variance (ANOVA) was used to test the differences in emotional effect between text messages with and without emoticons by applying it to each dependent measure for the effects of message type, emoticons, and gender.

Table 4 summarizes each of the *t*-test which can test the difference between two responses measured on the same statistical unit has a mean value of zero results on the comparison of text messages with and without emoticons (non-emoticon messages) in both male and female participants. Some of the difference are significant at the .01 level (denoted as $**$) or .05 level (denoted as $*$). We have the following four findings. First, negative emotion increases when negative emoticons are combined with text messages in both simplex and complex communication, which echoes Lo's study (Herring, 2000). Second, positive emoticons increase positive emotion only for the complex message type for both genders. Third, positive emoticons increase the positive emotions for the simplex message type for females only. Fourth, using neutral emoticons in IM does not affect the receivers' emotion in both simplex and complex task-oriented communication for all the participants.

The average value of intention to use emoticons in IM is 4.03 with a standard deviation of 0.66, which indicates a relative high intention to use. However, the difference in intention to use emoticons in IM is not significant with a *t*-value value of −1.8 and a *p*-value of 0.076 among 46 male participants (mean: 3.67, standard deviation: .85) and 30 female participants (mean: 4.0, standard deviation: .64). Even though the 0.05 significance level was not accepted, there is a tendency that females still had a higher intention to use emoticons to express their emotions when using IM compared with males.

5. Conclusions and suggestions

Drawing on the literature regarding the relationship of emoticons' effect and the text cues in IM, this study intended to explore the plausible potential effects of emoticons in the workplace. The results show that IM text messages containing emoticons generated different emotional effects compared with those without emoticons in some scenarios. Therefore, emoticons may serve the function of modified text messages. Separate conclusions and suggestions related to the four research questions as we raised at introduction section are briefly summarized as follows.

5.1. Research question 3: three types of messages

After analyzing the IM message logs in the case company, three main message types which employees use the most in IM to communicate at work are concluded: (1) task-oriented simplex communication such as for scheduling meetings, (2) task-oriented complex communication such as for discussing or coordinating tasks, and (3) social-oriented communication such as for greeting by saying hi. This result shown at Section 3.2 confirms the findings of some previous studies (Isaacs, Walendowski, Whittaker, Schiano, & Kamm, 2002; Nardi et al., 2000; Robb, 2001; Wang, 2005). In addition, some studies (Robb, 2001) argued that IM has become a financial planning tool for customers, and this research further supports that the use of IM in the financial industry can enhance internal communication. According to these research findings, we therefore suggest that the IM platform in the workplace should at least embed functions for scheduling meetings and discussing or coordinating tasks, and provide different emoticons for greeting.

Table 4
Summary of *t*-test results for all, male and female participants.

Question: Once your colleague send you the following message with IM, how do you feel? (1:very unhappy, 5:very happy)		ALL ($N = 76$)	Male ($N = 40$)	Female ($N = 36$)
Q1: We have to discuss in 5 min	Q2: We have to discuss in 5 min 	N	N	Y (.02*)
VS.	Q3: We have to discuss in 5 min 	N	N	N
	Q4: We have to discuss in 5 min 	Y (.000**)	Y (.000**)	Y (.000**)
Q5: Your opinion about the next step we should do? VS.	Q6: Your opinion about the next step we should do? 	Y (.001**)	Y (.012*)	Y (.056*)
	Q7: Your opinion about the next step we should do? 	N	N	N
	Q8: Your opinion about the next step we should do? 	Y (.000**)	Y (.000**)	Y (.000**)

Note: Y/N (*p* value), where Y means significant and N means non-significant.
* Significant at the .05 level (2-tailed).
** Significant at the .01 level (2-tailed).

5.2. Research questions 1 & 2: the effect of emoticons in task-oriented communication and gender difference

Based on the four findings indicated in Table 4, some suggestions are proposed accordingly. First, since positive emoticons significantly enhanced emotion when IM is used in discussing and coordinating tasks, we suggest that positive emoticons should always be employed in work coordination tasks, especially when there is a tendency for unpleasant emotions to be felt in the communication between senders and receivers. Second, we suggest avoiding the use of "flaming" emoticons in IM because these may cause unexpected negative emotions between the communicators even if the original intention was to just kid around. Furthermore, we suggest that the workplace IM system should prompt a "warning" message whenever a flaming emoticon is used in order to minimize probable unpleasant effects. Third, the use of neutral emoticons in unnecessary circumstances should be avoided since it has no significant difference as compared to the use of pure text messages. This corroborates the overuse claim by Walther and D'Addario (2001) in which it was indicated that the impact of emoticons is diminished with their overuse or unnecessary use.

5.3. Research questions 4 & 2: intention to use IM and gender difference

First, based on our observation, we argue that employees are more likely to use emoticons in text messages in the workplace when communicating with colleagues. This result as shown in Section 4 is in line with Rezabek and Cochenour's (1998) finding that the most common, widely recognized emoticons are most useful for communication. It may be that emoticons signal common knowledge. Furthermore, our finding echoes Walther and D'Addario's research results (2001) that emoticons can (1) actually serve indirect socially communicative functions, (2) assist e-mail senders act through serving as self-signaling cues, prompting the writer to write in such a way that is as expressive as he/she intends, and (3) aid the writer to express, check, and edit as needed that which may be unclear during the initial message production. However, they stated that emoticons are generative, not communicative.

Second, even if the test results did not support the assumption that female participants intend to use IM more than males do, we still argue that females have a higher tendency to use IM in the workplace. Females feel more pleasant in both simplex communication and complex communication, so we therefore suggest the use of positive emoticons in text messages to female partners in order to facilitate a smooth and enjoyable communication process. If there are some unpleasant emotions in the male-only conversation group, then a mixed-gender group should be encouraged to reduce negative emotions in the workplace.

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