Reply speed to mobile text messages among Japanese college students: When a quick reply is preferred and a late reply is acceptable

Yuuki Kato a,⇑, Shogo Kato b

a Sagami Women’s University, 2-1-1 Bunkyo, Minami-ku, Sagamihara, Kanagawa 252-0383, Japan
b Tokyo Woman’s Christian University, 2-6-1 Zempukuji, Suginami-ku, Tokyo 167-8585, Japan

A R T I C L E   I N F O

Article history:

Keywords:
Mobile text messaging
Reply timing
Reply speed
Emotion
M-learning
Digital native

A B S T R A C T

Speed of exchange is important in communication using mobile phones. This study analyzes responses to a questionnaire survey of Japanese university students about replies to mobile text messages. Respondents were asked to indicate situations where a quick reply was desired and situations where a slow reply was acceptable. Free responses were classified broadly into seven groups such as “attributes of the other party,” “one’s own emotional state,” “one’s own situation,” and “situation of the other party.” Additionally, gender differences were seen in these free responses, with men more often referring to the attributes of the other party and their own situation and women more often referring to the content of the text messages. The results of the questions asking respondents to rank emotions by desired speed of response showed that there are individual differences in the relation between the type of emotion conveyed and the desired speed of reply (e.g., a quick reply was desired when joy or apology was conveyed). These individual differences were then aggregated into three types by cluster analysis.

C211 © 2014 Elsevier Ltd. All rights reserved.

1. Introduction

1.1. Background to this study

Communication using mobile phones is an indispensable aspect of our modern lives (Faulkner & Culwin, 2005; Leung, 2007; Skierkowski & Wood, 2012). Ten years ago, mobile phone communications meant voice and email, with limited use of mobile phones to access the Internet. Smart phones, which have spread rapidly in recent years, however, have made it easy to use services such as social networking services and various communication tools through applications that use the Internet. In other words, modern mobile phones (which we will refer to collectively as smart phones below) provide a variety of communication tools and make it possible for us to choose different mobile phone communication tools depending on our purpose and circumstances. For example, during and soon after the Great East Japan Earthquake, which occurred in northeastern Japan on March 11, 2011, many transportation networks were unusable until the following day, including in the Tokyo metropolitan area. In Tokyo, the world’s most populous city, many people found it difficult to return to their homes in the suburbs. Crowds of stranded commuters used mobile phones to contact family and loved ones to confirm their safety, but due to network congestion at the time of the disaster, it was difficult to make voice calls or use Short Message Service (SMS). However, people were able after trial and error to check on each other’s safety by using mobile phone applications such as Twitter, Facebook, and web-based email (Ministry of Internal Affairs, 2012).

In Japan, where this study was conducted, mobile text messaging is currently the most used mobile phone communication tool (Ishii & Wu, 2006; Kato, Scott, & Kato, 2011; Lin & Tong, 2007; Scott, Kato, Kato, & Liu, 2012). In the workplace, of course, voice communication is generally used, but in daily communication, such as that between friends, family members, or romantic partners, mobile text messaging is the overwhelming favorite (Lu, Katoh, Chen, Nagata, & Kitamura, 2014; Lu et al., 2011; Scott et al., 2012). In contrast to telephone conversations, mobile text messaging is an asynchronous medium that involves the exchange of character-based messages. Because participants in mobile text messaging can check and reply to messages at a time of their choosing, the sender of the message causes no interruption to the recipient. Mobile text messaging therefore has a lower communication threshold than voice communication does, allowing the exchange of messages without fear of disturbing the other party. However, mobile text messaging has now reached the point where

⇑ Corresponding author. Tel.: +81 42 713 5089.
E-mail addresses: y-katou@star.sagami-wu.ac.jp (Y. Kato), shogo@lab.twcu.ac.jp (S. Kato).

http://dx.doi.org/10.1016/j.chb.2014.11.047
0747-5632/© 2014 Elsevier Ltd. All rights reserved.
it can no longer be described as an asynchronous medium (Kato, Kato, & Chida, 2012; Kato, Kato, & Chida, 2013). The anecdote below is an example that shows the difference between personal computer email and mobile text messaging.

A university professor working late at night to prepare for class sent an advance email to students’ mobile phones with various details about the lecture. However, one of the students objected to the professor’s conduct, citing loss of sleep and the need to reply to the professor’s emails sent late at night as the basis for the complaint (as cited in).

[Kato et al., 2012, p. 100]

In this anecdote, the university professor used an asynchronous medium, personal computer email, to send the message, but students who received the message on their mobile phones felt that they needed to confirm with an immediate response; that there was a complaint because the professor sent the email late at night is evidence of this. In other words, electronic bulletin boards and emails, both used to communicate asynchronously by personal computer, are considered by mobile phone users to be media to which an immediate response is required as it would be in chat. This study takes into account trends for asynchronous use of mobile text messaging such as the above.

1.2. Previous research

Mobile text communication is conducted with characters in the same manner as other computer-mediated communication (CMC) such as email, bulletin board systems (BBSs), and text chat. As discussed in a number of studies on CMC, a characteristic of character-based CMC exchanges is the absence of facial expressions and gestures, which can be used during face-to-face conversation, and also the absence of non-verbal cues, such as tone of voice. In early research on CMC conducted prior to the 1990s, various models and theories were proposed that were based on this characteristic of CMC. Some such models are the social presence model (Short, Williams, & Christie, 1976), the media richness theory (Daft & Lengel, 1984, 1986), the cueleness model (Rutter, 1984; Rutter, Stephenson, & Dewey, 1981), and the reduced social cues approach (Kiesler, Siegel, & McGuire, 1984; Sproull & Kiesler, 1986). Especially in early studies related to CMC, because CMC lacks the many non-verbal cues that can be used in face-to-face communication, CMC is characterized as inferior to face-to-face communication and likely to contribute to emotional difficulties (Dyer, Green, Pitts, & Millward, 1995; Joinson, McKenna, Postmes, & Reips, 2007; McGuire, Kiesler, & Siegel, 1987; Siegel, Dubrovsky, Kiesler, & McGuire, 1986).

However, subsequent CMC studies have shown many examples that demonstrate the possibility of socio-emotional communication that deepens personal relationships, even by the exchange of text messages that contain few non-verbal cues (Walther, 1992; Walther, Anderson, & Park, 1994; Walther & Burgoon, 1992). For example, studies that showed the facilitation of user self-disclosure in CMC (Joinson, 2001; Matheson, 1991; Matheson & Zanna, 1988) and Walther’s hyperpersonal model (Walther, 1996) are well known. These studies showed examples of the skillful employment of the poor non-verbal cues allowed by CMC, and also provided evidence that CMC increases the difficulty of communication because it lacks non-verbal information that exists in abundance during face-to-face communication (Walther & Tidwell, 1995).

Most prior CMC research focused on Internet-mediated communication that made use of personal computers. However, in Japan today, there are many people who use mobile phones, rather than personal computers, to communicate over the Internet (Ishii & Wu, 2006; Lu et al., 2011; Ministry of Internal Affairs & Communications, 2012; Scott et al., 2012). Internet communication that uses mobile phones differs from Internet communication in which personal computers are used. For example, research that compared personal computer email communication with mobile text communication showed that mobile text communication is more emotional (Coyne, Stockdale, Busby, Iverson, & Grant, 2011; Garrison, Remley, Thomas, & Wierszewski, 2011; Lin & Tong, 2007; Ogara, Koh, & Prybutok, 2014; Scott, Coursaris, Kato, & Kato, 2009; Tossell et al., 2012). Unlike personal computers, which are mainly used in the workplace and at home, mobile phones, always close at hand, are recognized by their users as a more personal and informal media. It is thought that exchanges filled with emotional expression are possible in mobile text messaging because icons and emoticons are used to compensate for the lack of non-verbal expressiveness in mobile text messaging (Garrison et al., 2011; Kato, Kato, & Scott, 2009; Tossell et al., 2012).

Additionally, the tendency for quick interaction on demand when using mobile phone messaging applications, when compared with communication by personal computer, is a notable trend. Accordingly, in communication via mobile phones, the responder may at times feel pressured to respond quickly, and the party waiting for a delayed response may at times begin to feel anxious and frustrated. The lack of non-verbal information in text communication has been the subject of much CMC research in the past. However, in mobile phone communication, which has come to play a major role in modern communication, the timing of responses can be considered to convey important non-verbal information. The possibility exists, for example, that a “slow” response itself can convey a negative emotion to the other party as non-verbal information. The authors have been studying the timing of replies to mobile text messages for some time. Kato, Kato, & Chida (2012, 2013) found through a survey of college students that the timing of replies is sometimes manipulated, for example by intentionally delaying one’s reply, and investigated the possible reasons for this behavior. Kato, Kato, Kubota, & Tachino (2013) investigated techniques employed to end long chains of text messages, and their results suggested that delayed reply is one such important technique. These studies had differing research goals, but a feature common to each was that the college students they studied assumed that when communicating by mobile text message, as a rule, all messages should be promptly responded to.

2. Rationale

In recent times, mobile phones, not just personal computers, have become widely used as Internet-based-communication devices (Dietz & Henrich, 2014; Faulkner & Culwin, 2005; Ishii & Wu, 2006; Leung, 2007; Skierkowski & Wood, 2012). In the same manner as this type of social change, mobile phone terminals, not only personal computers, have come to be used in e-learning as well, and there has been an increase in both research on and practical applications for the use of mobile phones in distance learning, also known as m-learning. Foundational research on conventional CMC has provided information about e-learning, but it is thought that conventional CMC research, which focuses on personal computer-based communication, cannot necessarily be extended to m-learning. In other words, information gained through conventional research is useful as a reference point when studying m-learning, but because mainly mobile phones are used in m-learning, the authors think that there is also a need for new foundational research into the characteristics of mobile phone communication.

In e-learning, for example, emotional support for the learner reduces drop-out and is important for increasing learning effectiveness. Social presence theory frequently refers to such support as a theoretical framework (Garrison & Anderson, 2003;
In personal computer-based communication, the use of emoticons, helping distance-learning students (Garrison & Anderson, 2003) and this is receiving more attention as an important factor for increasing social presence even in CMC (Swan, 2002; Richardson & Swan, 2003; Swan, 2002, 2003; Tu, 2000). In personal computer-based communication, the use of emoticons, mutual greetings, shared empathy, and self-disclosure were found to be important as necessary methods of increasing social presence (Swan, 2002, 2003).

In mobile phone communication there may be a demand for more than just an awareness of the other party: the student may be expected to be continuously made aware of “there is someone on the other side of the screen who is able to respond immediately,” and the student may be expected to be actually able to receive an immediate response. It is thought that, in mobile phone communications, direct proximity to the mobile phone is assumed: the other party is assumed to be right next to the mobile phone and is thus aware of any messages. It follows that when a reply is not quickly received, the waiting individual feels a sense of unease that the other party is not near the mobile phone. In other words, for messages exchanged in the course of learning, it is thought that the non-verbal information conveyed by the timing of the transmission of and response to the messages will become a more important factor in m-learning than it was in conventional e-learning (Kato, Kato, & Chida, 2012, 2013).

This study focuses on the speed of replies in mobile text communication. A questionnaire survey was conducted to investigate the following research questions.

1. For someone waiting for a response to a message, when is quick reply desired and when is a slow reply acceptable? A questionnaire survey conducted by Kato, Kato, & Chida (2012, 2013), which targeted Japanese youth and focused on the party replying to mobile text messages, showed that respondents, in principle, reply quickly in daily mobile text communication, but also that there are cases where the timing of a response is deliberately manipulated depending on the content and conditions surrounding the message received from the other party. This previous research focused on the responding party, but this study focuses on the party awaiting the response.

2. How, if at all, do answers to the first question differ by gender? There is abundant prior research (Hoy & Milne, 2010; Savicki & Kelley, 2000; Savicki, Kelley, & Oesterreich, 1999, for example) showing gender differences, both psychological and behavioral, in Internet communication style.

3. What emotions are conveyed by reply timing, and how does this relate to the first question? It is thought that mobile text messages frequently contain emotional expressions, which is based on findings in previous research that “mobile text message communication is richer in emotional content than PC email communication” (Coyne et al., 2011; Lin & Tong, 2007; Scott et al., 2009). Furthermore, Kato, Kato, & Chida (2012, 2013) refers to emotional strategies (Kato, Kato, Scott, & Sato, 2010) in response-timing that depend on the emotional states of both people.

Situations where a quick reply is desired and situations where a slow reply is acceptable have been taken up in this study, but this is not exhaustive of factors related to the desired speed of reply. Note that there is no exact correspondence between these two situations (in particular, we do not inquire into situations where a quick reply is acceptable or where a slow reply is desired). This is because we consider that in present-day mobile text messaging the expected time-to-response is generally short. We therefore consider that a quick reply is acceptable in almost all cases, and among those we wished to isolate those situations where a quick reply is desired specifically. We furthermore assume that in present-day mobile text messaging there are rarely cases where a slow reply is actively sought, and so we wished to focus on the situations where a slow reply is acceptable.

The authors conducted this survey to additionally establish basic research on the timing of message transmission and response for the purpose of m-learning; however, this study is only the first step in this research and targeted everyday mobile communication rather than specifically text communication in an m-learning environment.

3. Method

This survey was conducted in the form of a paper questionnaire in liberal arts course classes related to “information literacy” led by the authors and research assistants at three universities in the Tokyo area. Respondents in this survey were 238 Japanese university students enrolled in the abovementioned classes. Twenty students who provided invalid responses were excluded, giving a sample population of 218 (135 men, 83 women; mean age 20.40 years, SD = 1.59 years) for the analysis of the responses.

The survey was conducted in one day of the above-mentioned classes, with the survey being the class content for that day. Because several free description responses were required in this survey, as described below, it was thought that there was a larger burden on survey respondents than would have been the case for a survey comprising only multiple-choice questions, so it was necessary to give a higher incentive to respond. Because of this, survey administrators increased the incentive to respond by telling students beforehand that not only would the knowledge of this study be published but also that the aggregated results of the survey would be discussed in a subsequent lesson and that feedback would be used as part of the teaching material. The time for these procedures (including the time needed for responses, explanations by survey administrators, and collection of the questionnaire sheets) was about 30 min.

There were two main types of questions in the survey. First, free-response questions asked about various scenarios when a quick reply to a sent mobile text message would be preferred and those when a slower reply would be acceptable. Students were asked to provide up to four scenarios for each case. Second, ranking questions asked students to imagine sending a mobile text message expressing each of five emotions (joy, sadness, anger, apology, and love), and order them from 1 to 5 according to whether a quick reply would be desired and according to whether a slow reply would be acceptable. These five types of emotion were chosen on the basis of the authors’ previous research. Specifically, in the survey described in Kato, Kato, & Chida (2012, 2013), respondents mentioned these emotions in “Emotional situations where reply timing is manipulated.”

The English version of this survey (original in Japanese) is shown in Appendix A.

4. Results

4.1. Situations where a quick response to a mobile text message is desired and situations where a slow response is acceptable

In examining situations where a quick response to a mobile text message is desired and situations where a slow response is
acceptable, free responses of survey respondents were first catego-
ized by meaning and content, such as “when the other party is a
romantic partner or someone for whom I have romantic feelings,”
“when I’m lonely,” and “when I’m waiting for the other party.”
Among the resulting categories, a quick response was desired in
43 and a slow response was acceptable in 51.

These categories were then aggregated into several groups
according to the Kawakita *jirō* method of affinity grouping. The
steps of this method were as follows: we first created sticky notes
for each category and arranged them on a wall to create a viewable
list. We then sorted the notes into categories with similar meaning
or content, and gathered them into groups. We also integrated
affinitive groups into single groups. Categorization was performed
by three researchers.

As a result, both types of situations were arranged into seven
groups: “responses related to the attributes of the other party,”
“responses related to one’s own emotional state,” “responses
related to one’s own situation,” “responses related to the situation
of the other party,” “responses related to situations of both self
and the other party,” “responses related to information con-
veyed to the other party,” and “responses related to information
desired in the other party’s reply.”

The “responses related to the attributes of the other party”
group comprises responses that mention the other party. The
“responses related to one’s own emotional state” group comprises
responses related to one’s own emotional state while waiting for a
reply message. The “responses related to one’s own situation”
group comprises responses related to one’s own situation when
waiting for a reply message. The “responses related to the situation
of the other party” group comprises responses related to the sit-
uation of the replying party. The “responses related to the situations
of both self and the other party” group comprises responses related
to the situations of both the party waiting for the reply and the
replying party. The “responses related to information conveyed
to the other party” group comprises responses related to informa-
tion sent to another party by mobile text message. The “responses
related to information desired in the other party’s reply” group
comprises responses specifically related to information obtained
from the other party’s response in the “responses related to infor-
mation conveyed to the other party” group, and is distinct from
“responses related to information conveyed to the other party.”

Tables 1 and 2 show the categories allocated to each group, the
number of responses in each category, and the ratios of men and
women whose replies are classified into each category. Situations
where a quick response is desired are shown in Table 1, and situa-
tions where a slow response is acceptable are shown in Table 2.

Regarding both situations where a quick reply is desired and sit-
uations where a slow reply is acceptable, the numbers of responses
by men and women among the responses classified into each
group were counted. Additionally, the numbers of responses clas-
sified into each group were calculated as a gender percentage of
the total number of responses of all groups. For both situations
where a quick reply is desired and situations where a slow reply
is acceptable, a chi-square test was performed to investigate
whether there is a difference between answers by gender. As a
result, significant gender differences were seen in both situations
(situations where a quick reply is desired: $\chi^2 = 19.59, df = 6,$
$p < 0.01$; situations where a slow reply is acceptable: $\chi^2 = 28.01$,
$df = 6, p < 0.001$). Furthermore, significant differences between
genders were seen in several groups by residual analysis. The
detailed results are shown in Table 3.

As seen in Table 3, in situations where a quick reply is desired,
most responses were classified into the group of “responses related
to information desired in the other party’s reply.” Also, this group
was selected significantly more frequently by women than by men.
Many of the categories and responses in this group were relatively
more concerned with situations where a quick response is desired
than with situations where a slow reply is acceptable. That is, a
quick reply is typically desired when waiting for a reply in situa-
tions such as “when I asked the other party a question,” “when I
asked the other party for confirmation,” “when I consulted with
the other party,” or “when I asked the other party for instructions.”
Also frequently mentioned were “when setting a plan with the
other party” and more specific responses, such as “when inviting
the other party for a meal or entertainment,” “when confirming
the other party’s attendance (at an event, etc.),” and “when asking
the other party to perform an errand.” In such cases, the other
party’s reply is necessary to finalize related matters, and a quick
reply is naturally desired so that pending matters can be quickly
resolved, especially “when asking the current whereabouts of the
other party” in regard to impending plans.

In situations where a quick reply is desired, significant differ-
ences were seen in the ratio of responses given for the “responses
related to the attributes of the other party” group. In this group, a
large majority of responses where a quick response was desired
were categorized as “when the other party is a romantic partner
or someone for whom I have romantic feelings.” Men gave this
response more frequently than women did, especially the response
“when the other party is of the opposite gender.”

In situations where a slow reply is acceptable, most responses
were classified into the “responses related to information con-
veyed to the other party” group, and this was disproportionately
true for women (Table 3). Among situations in which a slow
reply is acceptable, ambiguous responses, such as “when I con-
veyed unimportant information” and “when I communicated a
non-urgent matter” constituted the top responses. “When
communicating everyday topics” is also viewed as an unimpor-
tant topic. Also, when conveying understanding and one’s own
opinions or thoughts, such as “when communicating that I’ve
understood” or “when communicating my opinions or feelings,”
there are cases where this is a reply to the other party’s mes-
sage, and these are subsequently considered to fall under the
category “when I conveyed information not requiring a reply.”
Communication conveying courtesy or civility, such as “when
conveying gratitude or a greeting” and “when conveying birth-
day greetings” can be considered as not requiring an especially
fast reply because they are generally sent as a one-way message
to the other party.

Furthermore, in situations where a slow reply is acceptable, the
second-highest number of responses were classified into the
“responses related to one’s own situation” group, which was
selected disproportionately often by women. In this group, there
were many categories and responses in situations where a slow
reply is acceptable compared with situations where a quick
response is desired. Responses corresponding to “when I don’t
have time” were more likely to correspond to situations where
a slow response is acceptable than to situations where a quick
reply is desired. In this group, “when I’m busy,” “when I’m work-
ing,” “when I’m sleeping,” “when I’m focusing on something else,”
and so forth accounted for almost all the categories of situations
where a slow reply is acceptable. The reason why responses in these sit-
uations corresponded to a slow reply being acceptable is thought
to be that the original sender either lacks the time to read and
respond to a reply message (if required), even if it arrived quickly,
or does not want to take the time to do so. In contrast, among sit-
uations where a slow reply is acceptable, some situations were
“when I have the time to spare,” indicating that the individual
had the time to wait for a reply.
4.2. Emotion conveyed in mobile text messages and the desired speed of reply

We next describe the results of ranking the scenarios according to one of five emotions indicated in the message. To examine overall trends, we first investigated the ratio of rankings for each emotion. Fig. 1 shows the ratio of responses for the rankings given to each emotion when a quick reply is desired, and Fig. 2 shows the ratio of responses for the rankings given to each emotion when a slow reply is acceptable. Although there was some level of evident bias for specific emotions, responses were quite varied. We therefore decided to create several groups of responses on the basis of the trends observed. Grouping was performed by using the two-step cluster analysis feature of IBM SPSS Statistics ver. 21.0, by which we analyzed the ranking for each of the five emotions when a quick reply is desired and when a slow reply is acceptable, for a total of 10 variables. This resulted in three clusters of responses, which we refer to as C1, C2, and C3. Additionally, the reasons for having three clusters are that three clusters is the optimal solution according to the Bayesian information criterion (Schwarz, 1978) and that this solution has high interpretability. Fig. 3 shows the ratio of responses for each rank in each cluster and the ranking for each emotion when a quick reply is desired, and Fig. 4 shows the ratio of responses for each rank in each cluster and the ranking for each emotion when a slow reply is acceptable. Table 4 describes the features of each cluster, as determined by comparing the response ratios for ranking each emotion.

### Table 1

<table>
<thead>
<tr>
<th>Category</th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Responses related to the attributes of the other party</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When the other party is a romantic partner or someone for whom there are romantic feelings</td>
<td>33</td>
<td>12.0%</td>
<td>10</td>
</tr>
<tr>
<td>When the other party is of a different gender</td>
<td>7</td>
<td>5.2%</td>
<td>0</td>
</tr>
<tr>
<td>When the other party is of the same gender</td>
<td>2</td>
<td>1.5%</td>
<td>0</td>
</tr>
<tr>
<td>When the other party is someone from whom there is not much contact</td>
<td>2</td>
<td>1.5%</td>
<td>0</td>
</tr>
<tr>
<td>When the other party is a friend</td>
<td>2</td>
<td>1.5%</td>
<td>0</td>
</tr>
<tr>
<td><strong>Responses related to one’s own emotional state</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I’m lonely</td>
<td>6</td>
<td>4.4%</td>
<td>3</td>
</tr>
<tr>
<td>When I’m angry</td>
<td>5</td>
<td>3.7%</td>
<td>1</td>
</tr>
<tr>
<td>When I’m happy</td>
<td>2</td>
<td>1.5%</td>
<td>3</td>
</tr>
<tr>
<td>When I’m insecure or worried</td>
<td>0</td>
<td>0.0%</td>
<td>3</td>
</tr>
<tr>
<td>When I’m excited</td>
<td>2</td>
<td>1.5%</td>
<td>1</td>
</tr>
<tr>
<td>When I’m enjoying myself</td>
<td>2</td>
<td>1.5%</td>
<td>1</td>
</tr>
<tr>
<td>When I’m sad</td>
<td>2</td>
<td>1.5%</td>
<td>0</td>
</tr>
<tr>
<td>When I want comfort or encouragement</td>
<td>1</td>
<td>0.7%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Responses related to one’s own situation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I have free time</td>
<td>17</td>
<td>12.6%</td>
<td>13</td>
</tr>
<tr>
<td>When I’m busy</td>
<td>12</td>
<td>8.9%</td>
<td>4</td>
</tr>
<tr>
<td>Before I go to bed</td>
<td>5</td>
<td>3.7%</td>
<td>2</td>
</tr>
<tr>
<td>When my mobile phone battery is about to run out</td>
<td>6</td>
<td>4.4%</td>
<td>0</td>
</tr>
<tr>
<td>When I want to continue text messaging</td>
<td>3</td>
<td>2.2%</td>
<td>1</td>
</tr>
<tr>
<td>When I’m interested in or can empathize with the subject</td>
<td>2</td>
<td>1.5%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Responses related to the situation of the other party</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When there is no contact from the other party</td>
<td>5</td>
<td>3.7%</td>
<td>2</td>
</tr>
<tr>
<td>When the other party says they are concerned</td>
<td>2</td>
<td>1.5%</td>
<td>1</td>
</tr>
<tr>
<td>When I can’t connect to the other party’s phone</td>
<td>2</td>
<td>1.5%</td>
<td>0</td>
</tr>
<tr>
<td><strong>Responses related to the situations of both self and the other party</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I’m meeting the other party</td>
<td>45</td>
<td>33.3%</td>
<td>30</td>
</tr>
<tr>
<td>When there’s been a disaster (confirmation of safety)</td>
<td>10</td>
<td>7.4%</td>
<td>4</td>
</tr>
<tr>
<td>Work-related exchanges</td>
<td>9</td>
<td>6.7%</td>
<td>3</td>
</tr>
<tr>
<td>When the parties are arguing</td>
<td>4</td>
<td>3.0%</td>
<td>4</td>
</tr>
<tr>
<td>Exchanges for club activities</td>
<td>3</td>
<td>2.2%</td>
<td>0</td>
</tr>
<tr>
<td><strong>Responses related to information conveyed to the other party</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When communicating an urgent matter</td>
<td>67</td>
<td>49.6%</td>
<td>47</td>
</tr>
<tr>
<td>When conveying important information</td>
<td>16</td>
<td>11.9%</td>
<td>11</td>
</tr>
<tr>
<td>When confessing my love for the other party</td>
<td>9</td>
<td>6.7%</td>
<td>2</td>
</tr>
<tr>
<td>When I told the other party I was concerned about their reaction</td>
<td>6</td>
<td>4.4%</td>
<td>4</td>
</tr>
<tr>
<td>When I told the other party of a change in plans</td>
<td>4</td>
<td>3.0%</td>
<td>6</td>
</tr>
<tr>
<td>When I apologized</td>
<td>5</td>
<td>3.7%</td>
<td>4</td>
</tr>
<tr>
<td>When I conveyed information that also affected a third party</td>
<td>1</td>
<td>0.7%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Responses related to information desired in the other party’s reply</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When setting a plan with the other party</td>
<td>44</td>
<td>32.6%</td>
<td>28</td>
</tr>
<tr>
<td>When asking the other party a question</td>
<td>26</td>
<td>19.3%</td>
<td>24</td>
</tr>
<tr>
<td>When asking the other party for confirmation</td>
<td>10</td>
<td>7.4%</td>
<td>8</td>
</tr>
<tr>
<td>When inviting the other party for a meal or entertainment</td>
<td>5</td>
<td>3.7%</td>
<td>7</td>
</tr>
<tr>
<td>When the other party’s attendance (at an event, etc.)</td>
<td>5</td>
<td>3.7%</td>
<td>8</td>
</tr>
<tr>
<td>When asking the other party to perform an errand</td>
<td>5</td>
<td>3.7%</td>
<td>8</td>
</tr>
<tr>
<td>When asking the current whereabouts of the other party</td>
<td>7</td>
<td>5.2%</td>
<td>3</td>
</tr>
<tr>
<td>When I consulted with the other party</td>
<td>0</td>
<td>0.0%</td>
<td>5</td>
</tr>
<tr>
<td>When I asked the other party for instructions</td>
<td>1</td>
<td>0.7%</td>
<td>3</td>
</tr>
</tbody>
</table>
Examining the features of the groups found by cluster analysis, we first note that C2 and C3 indicate opposing trends. C2 prefers a quick reply to messages with positive emotional content, such as joy or love, and a slower reply is considered acceptable for messages with negative emotional content, such as sadness or anger. However, C3 prefers a quick reply to negative emotions, while a slower reply is acceptable for positive emotions. Furthermore, although both C2 and C3 found a slow reply to apologies acceptable, C1 desired a quicker reply. C1 is also characterized by desiring a quick reply to messages expressing joy but at the same time accepting a slow reply to the same emotion.

Although relatively low in number, there were some responses to the free-response question that mentioned the emotional state of the sender as a factor for desiring a quick reply (see Table 1), such as “when I’m angry,” “when I’m happy,” “when I’m excited,” “when I want comfort or encouragement,” “when I’m anxious to...
### Table 3
Numbers of responses allocated to each group by gender for situations where a quick reply is desired and where a slow reply is acceptable.

<table>
<thead>
<tr>
<th>Group</th>
<th>Quick reply is desired</th>
<th>Slow reply is acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Responses related to the attributes of the other party</td>
<td>46 (11.4%)</td>
<td>10 (3.9%)</td>
</tr>
<tr>
<td></td>
<td>4.054</td>
<td>2.589</td>
</tr>
<tr>
<td>Responses related to one's own emotional state</td>
<td>20 (5.0%)</td>
<td>13 (5.0%)</td>
</tr>
<tr>
<td></td>
<td>0.062</td>
<td>0.040</td>
</tr>
<tr>
<td>Responses related to one's own situation</td>
<td>45 (11.1%)</td>
<td>21 (8.1%)</td>
</tr>
<tr>
<td></td>
<td>1.491</td>
<td>0.952</td>
</tr>
<tr>
<td>Responses related to the situation of the other party</td>
<td>9 (2.2%)</td>
<td>3 (1.2%)</td>
</tr>
<tr>
<td></td>
<td>1.242</td>
<td>-0.793</td>
</tr>
<tr>
<td>Responses related to the situations of both self and the other party</td>
<td>71 (17.6%)</td>
<td>41 (15.9%)</td>
</tr>
<tr>
<td></td>
<td>0.642</td>
<td>-0.410</td>
</tr>
<tr>
<td>Responses related to information conveyed to the other party</td>
<td>108 (26.7%)</td>
<td>75 (29.1%)</td>
</tr>
<tr>
<td></td>
<td>-0.038</td>
<td>0.446</td>
</tr>
<tr>
<td>Responses related to information desired in the other party's reply</td>
<td>105 (26.0%)</td>
<td>95 (36.8%)</td>
</tr>
<tr>
<td></td>
<td>-3.094</td>
<td>1.976</td>
</tr>
</tbody>
</table>

Note. The upper value for each group shows the number of responses classified into the relevant group. Numbers in parentheses are the proportions of all responses in the column. The lower value for each group shows the standardized residual value.

* p < .05.
see how the other person will respond," and "when we're discussing a topic that we feel the same about." The reason for this mixture in the responses of both positive and negative emotions is likely explained by the differing features of the three groups discovered through cluster analysis.

5. Discussion

5.1. General discussion

The results of this study showed that seven factors affect judgment of whether a quick reply is desired or whether a slow reply is acceptable in response to a mobile text message. Among these, especially in situations where a slow reply is acceptable, the overwhelming majority of response categories were related to the individual’s own situation as compared with response categories related to the other party’s situation or those related to the situations of both. It is thought that these results show that whether a slow reply by the other party is acceptable depends more on the condition of the individual who is waiting and that the condition of the party making the reply is not really taken into consideration.

Comparing the answers given to the two questions in the free-response section of the survey, we found that there were many mentions of the ability or inability of the sender or recipient to use their mobile phone, particularly in the description of scenarios where a slow reply would be acceptable. This can likely be interpreted as a desire for a quick reply when the message recipient is in a situation where they can use their mobile phone. When a message is sent but a reply does not come quickly, there is a tendency to assume that the recipient is in a situation where mobile phone use is not possible; this assumption may be shared by our survey respondents.

The LINE smartphone application, used for interpersonal messaging, is hugely popular in Japan. The Japanese media has recently featured many stories of so-called “LINE fatigue,” a phenomenon in which undue stress is caused by knowing that a message has been received (because the application reports it as having been read), but no reply has been received yet. While this is somewhat different from simple mobile text messaging between mobile phones, given the conclusions of this study it may be that the “read” status of a message and its reply are expected to come as a set, which results in pressure on both parties.

With regard to the speed of the reply from the other party, free responses that mentioned the content of the message sent to the other party showed that, in most cases, when sending content that required a reply from the other party, a quick reply is desired.

Table 4

<table>
<thead>
<tr>
<th>Responses</th>
<th>Cluster description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 Men n = 69</td>
<td>Quick reply desired for messages expressing joy or apology. Slow reply acceptable for messages expressing joy or sadness</td>
</tr>
<tr>
<td>Women n = 42</td>
<td></td>
</tr>
<tr>
<td>Total n = 111</td>
<td></td>
</tr>
<tr>
<td>C2 Men n = 40</td>
<td>Quick reply desired for messages expressing joy or love. Slow reply acceptable for messages expressing sadness, anger, or apology</td>
</tr>
<tr>
<td>Women n = 21</td>
<td></td>
</tr>
<tr>
<td>Total n = 61</td>
<td></td>
</tr>
<tr>
<td>C3 Men n = 26</td>
<td>Quick reply desired for messages expressing sadness or anger. Slow reply acceptable for messages expressing joy, love, or apology</td>
</tr>
<tr>
<td>Women n = 20</td>
<td></td>
</tr>
<tr>
<td>Total n = 46</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 4. Ratios of responses for the rankings for each emotion when a slow reply is acceptable, by rank and cluster.
Several past studies on CMC have described the results of questions relating to text communication that was limited to non-verbal information. These studies showed that by sending CMC messages that included questions to the other party, several effects occurred: the other party experienced positive emotions, such as joy (Kato, Sugimura, & Akahori, 2002); the other party was able to be made more aware of the individual's social presence (Garrison & Anderson, 2003; Swan, 2002); and socio-emotional communication was made easier (Kato, Sugimura, & Akahori, 2005). However, it is generally assumed in mobile text messaging that mobile phones and their users are directly connected, and so it is thought that there is a high sense of the presence of the person on the other side of the screen from inception of communication. For this reason, it is unlikely that good communication is established by questions alone. In other words, in mobile text communication, it is thought that quick replies to questions contribute to a sense of ease about the presence of both parties, allowing the exchange to proceed.

Results from a questionnaire asking respondents to rank each of five types of emotion by the desired speed of the other party's reply in situations where each of the five emotions were conveyed to the other party showed three types of desired response pattern related to the type of emotion conveyed and the desired speed of the reply. Different patterns were also seen within these types. Specifically, there was a group that desired a quick reply when a positive emotion was conveyed and accepted a slow reply when a negative emotion was conveyed and, conversely, there was a group that desired a quick reply when a negative emotion was conveyed and accepted a slow reply when a positive emotion was conveyed. Additionally, these two groups responded that a slow reply was acceptable when making an apology, but there was another group who responded that a quick reply was desired when making an apology. In other words, the three types can be classified according to the dimension of positive-negative emotion as the emotion conveyed when a quick reply is desired (placing both positive and negative emotions on a single axis for convenience) and according to the dimension of the emotion of apology.

5.2. Gender differences

Gender differences were seen in evaluation of situations where a quick reply is desired and situations where a slow reply is acceptable.

The rate of “responses related to the attributes of the other party” was higher for women than for men. Table 1 shows that men desire quick responses, especially from persons they have or hope to have a romantic relationship with. In contrast, Table 2 indicates a trend of men being accepting of slow replies from persons in other close relationships, such as friends or family. Table 4 shows that 29.6% of men belonged to group C2 (those that desire a quick response to messages expressing love) which is more than the 19.3% belonging to group C3 (those that are accepting of a slower response). Women were nearly evenly split between groups C2 (25.3%) and C3 (24.1%). Boneva, Quinn, Kraut, Kiesler, and Shklovski (2006) previously showed that adolescent boys more frequently cited message content as determinative of whether a quick reply was desired or whether a slow reply was acceptable. Tables 1 and 2 show that women in particular showed a trend for desiring quick replies to messages containing invitations, requests, and inquiries, but were accepting of later replies to messages containing greetings or thanks.

From these results, it seems that men focus on the surface aspects of mobile text communication at a higher rate than women do, and that women focus on the content of the message itself at a higher rate than men do.

5.3. Suggestion for m-learning research

The most important information that this study can contribute to m-learning is a clearer point of view from which to measure individual characteristics related to mobile text communication among learners. That the speed of reply is an important factor in mobile phone text communication is clear from the results of both past research and this study, but there are thought to be individual-level differences. These individual-level differences relate to what determines the desired speed of reply, even beyond the situations considered in this study. Among the various situations desired in the free responses obtained in the course of this study, there seem to be personal differences in which situations are deemed important. Specifically, analysis of the rankings according to the emotional content of messages indicated that there is a high level of individual difference regarding emotional content and expectations of reply speed. It is possible that when such differences result in a betrayal of expectations, discomfort in communication may result. In other words, especially in situations such as communication, where multiple people are involved, knowing the individual preferences of individual learners is an important factor in preventing unexpected difficulties.
This study showed the existence of seven components as factors that affect the judgment of in which situations a quick reply is desired and in which a quick reply is not required. In future research it will be possible to use categories that include these components in questions and, for example, to create a 5- or 7-level rating scale from “a slow reply is acceptable” to “a quick reply is desired.”

The respondents to the survey in this study were Japanese university students, so-called “digital natives,” a generation born and raised in an environment in which the Internet, mobile phones, email, and similar technologies were close at hand (e.g., Bennett, Maton, & Kervin, 2008). Because of the wide range in age of distance learning students as compared with students who commute to school, however, age-related differences in mobile text communication is an important subject for consideration. Additionally, because people of various nationalities are able to participate in the same study community through distance learning, cultural differences in text communication are also an important subject for consideration. By using a scale created on the basis of the findings obtained in this study, it should be possible to measure trends among people of various generations and of various nationalities around the world and, by comparing these data, to investigate cultural differences related to reply speed in mobile text communication. As mentioned above, the authors think that, in addition to the specific results shown in this study, these results have the potential to contribute to future m-learning research.

5.4. Limitations and future works

In this study, the impression of “fast” or “slow” in reply speed was left up to the survey respondents. The reason for this is that we considered the subjective impression, which depends on the sense of time while waiting for a reply in various situations, to be more suitable for first-stage research on reply speed than exact figures for determining whether the reply was quick or slow. However, in cases where the reply speed is implemented as a form of learner support, as in an actual m-learning environment, for example, a specific standard is likely to be required. To quantify this, if the above-mentioned 5-step rating scale were used, for example, this scale would yield a 5-level rating, and so the desired speed of reply could be compared for each question item (i.e., for each situation), and although this would not be an exact figure, the relative time difference between the items would be known. From that, it would be possible to develop a standard for reply speed.

Additionally, because of the pool of respondents, this study cannot conclude whether all generations of all areas of the world will show the same characteristics. We hope that future studies will be conducted on this topic to evaluate responses from individuals of various ages and nationalities. We hope that a scale will be created, as above, for the purpose of overcoming the limitations of this study. We plan to create a scale based on the results obtained from this survey.

Finally, this study addressed text messaging in daily, informal situations. However, there are also mobile device text communication tools, such as email that require sending and checking of long texts and attached files. In the future, it will also be necessary to examine reply speeds in various types of mobile communication.

Appendix A. Questionnaire Used in This Survey

<table>
<thead>
<tr>
<th>Gender: Female / Male</th>
<th>Age: _____ years</th>
</tr>
</thead>
</table>

1. During mobile text messaging, for messages that you yourself send, in what situations do you desire a quick response from the other party almost all of the time?

   Please be as detailed as possible, and give multiple instances (at least 3).

   1.
   2.
   3.

2. Which feelings (emotions) in your message do you want a quick response to?

   Please rank the following 5 emotions by decreasing order of speed of response desired.
   (1) Joy (2) Sadness (3) Anger (4) Apology (5) Love

   1st ( ) 2nd ( ) 3rd ( ) 4th ( ) 5th ( )

3. During mobile text messaging, for messages that you yourself send, in what situations is a slow response from the other party acceptable?

   Please be as detailed as possible, and give multiple instances (at least 3).

   1.
   2.
   3.

4. For which feelings (emotions) in your message is a slow response acceptable?

   Please rank the following 5 emotions by order, from most to least, on acceptability of a slow response.
   (1) Joy (2) Sadness (3) Anger (4) Apology (5) Love

   1st ( ) 2nd ( ) 3rd ( ) 4th ( ) 5th ( )

   Note: Please write the number of an emotion, as given above, beside each rank.

This completes the survey.
The results will be aggregated and discussed in a future class session on email.

Acknowledgment

This work was supported by JSPS KAKENHI Grant Numbers 24501220, 24700913.

References


