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Small Talk with Friends and Family:

Does Text Messaging on the Mobile Phone Help Users Enhance Relationships?

Keiko Tanaka

A dissertation submitted in partial fulfillment of the requirements of the degree of

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Abstract

Small Talk with Friends and Family: Does Text Messaging on the Mobile Phone Help Users Enhance Relationships?

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Text messaging on the mobile phone is a recent and significant global phenomenon requiring an inquiry. Billions of messages are sent each month worldwide. One may question what the act of exchanging short text messages on the mobile phone (I call it m-mail), with seemingly trivial content, really does for the user. Rather than trying to construct a long list of possible uses and motives for m-mail, in this study I examine whether m-mail is related to relationship development by comparing Japanese m-mail users with their Swedish counterparts.

I posed four research questions (RQ). RQ #1, concerning frequency of m-mail and message content, is the basic information required to understand the phenomenon. The results of RQ#1 become the context for RQ#2, the primary focus of this study—a possible link between m-mail and relationship maintenance. RQ#3 specifically looked at in-country variations and RQ#4 examined variance between countries.

Because a single theory was unlikely to explain the phenomenon, I looked for various possible components in the literature in the fields of CMC, interpersonal relationships, and the mobile phone.

I used an administered survey and Q-methodology with a purposive and snowball sample of 96 people--40 in Stockholm and 56 in Tokyo. Q factor analysis identified respondents' types--four types in each country and five types in the combined sample. Type was found to be related to the key concepts of this study: frequency of m-mail use, message content, and the idea as to whether m-mail helps users to maintain relationships with friends and family. Occupation, that is, whether the respondent is a student or non-student, is the most clearly differentiating demographic variable for the Swedish sample. For the Japanese sample, occupation, age and household are almost equally significant.

M-mail is an efficient communication tool for people with busy life style, but it is used for more than convenience and practical purposes. Despite variations, among individuals, in the idea of relationship and how it should be maintained, I believe that small talk, the main characteristic of m-mail, does have a function to maintain and even to enhance relationships.

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INTRODUCTION

Communications technologies have historically changed the way people communicate with friends and family. Examples include the telephone, voice mail, and the Internet. Over the past few decades, people have increasingly been using the computer for interpersonal communication purposes. With the advent of the World Wide Web and the popularity of Internet-based electronic messaging, users are adopting computer-mediated electronic messaging into their routine communication activities. Some of the matters that were previously discussed in face-to-face interactions or over the phone are now exchanged via e-mail.

Electronic text messaging on the mobile phone (I call it "mobile text messaging" from now on) is a recent and significant phenomenon requiring an inquiry. Compared with the other modes of mediated communication, mobile text messaging is more private, available in any place and at any time, shorter in length, more interactive, and requires few writing skills. One may use the medium for practical activities, such as setting up a meeting appointment, letting the other know his/her arrival time, and making inquiries. In addition, despite its short length and trivial content, mobile text messaging appears to be used for developing and maintaining interpersonal relationships. The results of my preliminary interviews with mobile text messaging users conducted in summer 2001 indicate such sociable and emotional uses. Ritual greetings just to say "Hello" or "Good night," loving messages, simply asking a friend "How are you?" or "What are you doing?" for no specific reasons are examples. Mobile text messaging, together with the voice function of the mobile phone, is a particularly personal electronic communication tool, given its small size and constant availability. This is especially important for keeping in touch with friends and family.

While e-mail, fixed (wire line) telephones and mobile phones are available, some people use mobile text messaging constantly. There must be some user needs that this medium satisfies more effectively than other communication media do. One may question what the act of exchanging short text messages on the mobile phone (hereafter

referred to m-mail), with seemingly trivial content, really does for the user. Does a user think that constantly sending and receiving cryptic messages to and from friends or family members are especially useful in maintaining or developing his/her relationships with those people? Does the user create his/her own special uses and also secret codes that can be understood only by selected members of a group? Does the user tend to contact someone when he/she feels lonely? Or does the user just do it for fun? One could construct a long list of possible uses and motives for mobile text messaging. There must be a variety of motives for m-mail use, and it may not be meaningful to attempt to list all of these, as the use of this medium depends, in most part, on the situation and the nature of the communicators' relationship.

Rather than trying to identify motivation for use, in this study I focus on an important function of the medium that contributes to relationship development--initiation, maintenance, and disengagement. How are the user's actual, offline relationships related to the way he/she uses mobile text messaging with those same people? How are the m-mail users' social networks or interpersonal relationships changed, if any, from the users' viewpoints? Does this medium help the users to enhance interpersonal relationships? Thus, this study examines how m-mail may be perceived and used for the development of interpersonal and small-group relationships.

CHAPTER 1: STATEMENT OF PROBLEM

1.1 Significance of Mobile Text Messaging

People in many parts of the world today use mobile phones for practical, informational, and sociable communication purposes. The popularity of m-mail is a relatively recent phenomenon, but its use is rapidly expanding, according to newspaper and magazine articles and reports of the wireless communication industry and national telecommunications authorities in Europe and Japan. In September 2001, the number of Short Message Service (SMS)[1] messages sent from mobile devices reached three quarters of a billion a day worldwide (GSM Association, 2001a).

SMS and mobile Internet phones are becoming popular in a number of countries, although the technology has not yet been widely accepted in the U.S. E-mail has been the most popular application of the Internet. The same e-mail phenomenon has apparently started occurring in the wireless world (Gurley, 2000). This time, the speed of m-mail adoption is even faster, particularly in the youth market, than e-mail (GSM Association, 2001a).

In Japan, for example, more than 49 million people, or 73% of the entire mobile phone users (67.5 million) in the country with a population of 126 million, already own the mobile Internet phone (Scott-Joynt, 2002). According to a May 1999 survey conducted by NTT DoCoMo, the largest mobile network operator in Japan, the services used the most on mobile Net phones were m-mail, mobile banking, and train timetable and inter-train transfer information (NTT DoCoMo, 1999). A survey conducted by the Multimedia Promotion Center in 1999 found that over 42% of Japanese mobile users were sending or receiving more than half of text messages on their mobile terminals as opposed to the PC connected to the fixed telecommunications network (Matsumoto, 1999). Another survey revealed that 20% of mobile users used more e-mail messaging than phone calls (Ohta, 2000a).

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[1] SMS is part of GSM mobile phone service. GSM is a de facto global standard for mobile communication used in Europe and many other countries worldwide. Japan's mobile communication standard is not GSM, and the country's mobile data service is based on an IP (Internet) network. In this

As another example, in Sweden, during the first half-year 2001, mobile phone users sent 463 million SMS messages, which was almost as many as for the whole year 2000 and more than three times as many as for all of 1999. Each mobile phone subscriber sent 12.8 SMS messages a month on average during the first half year 2001, a 146% increase from 5.2 for the corresponding period in the previous year, while the mobile phone penetration rate increased only by 10% from June 2000 (65%) to June 2001 (75%). Personal (non-business) SMS use was 82% of those messages sent (Swedish National Post and Telecom Agency, 2001).

There may be a number of reasons why this particular communication practice, sending and receiving m-mail messages, has become popular. Users might think that it is more fun or convenient to use text messaging while they are on the go. They might also feel privacy is protected better that way because their conversations could not be overheard. And some might just do it because everybody else is doing so.

The mobile phone is no longer merely a tool for voice communication. It is a more general communication device (Weilenmann & Larsson, 2001). Research on the non-technical aspects of mobile technology is critical because the social and cultural aspects largely determine the success or otherwise of huge investments the mobile communications industry has made (Brown, 2001). Mobile telephones are not only technological products but also social objects. "They impact how we organise our days and our evenings, how we work, and even how we make new friends....While the technology has certainly changed our culture, culture itself has remade this technology in a thousand different ways" (p. 3). People might dismiss mobile phones as trivial devices, but these little devices have something to reflect changing society. Such changes are taking place before our eyes. The social definition of the technology is undergoing. The new-ness of the phenomenon allows a researcher to gather data as it happens (Ling & Yttri, 2002).

Scholars agree, "It is likely that many other countries are approaching what Scandinavia and Japan are experiencing" (Weilenmann & Larsson, 2001, p. 93).

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study, I use mobile text messaging or m-mail to denote both SMS and the Japanese mobile Internet text messaging service (called "Keitai-mail" in Japanese).

1.2 Problem Statement and Research Questions

1.2.1 Problem

My interest is to investigate how m-mail might be changing the way people communicate with friends and family and perceptions of interpersonal communication as a whole. One can easily see the phenomenon of mobile text messaging, for example, in Japan because people use it everywhere--in restaurants, trains, department stores, schools, and on the street. In fact, a study conducted in 2000 found that 70% of the people, between age 15 and 69, walking on streets of 16 cities in the Tokyo metropolitan area were carrying mobile phones (Watanabe, 2000). More than 90% of people in their teens and 20s took their mobile phones with them when they went out of the home.

I have made unobtrusive observation as to how people in Japan use their mobile phones. Interestingly, a mobile phone user's voice is not heard in certain places such as restaurants and trains. They just move their fingers, mostly the thumbs, restlessly across the phone's keypad. One reason might be that they are constrained by general public manners, so that they rarely talk on the phone in an enclosed public place. I saw some young people sending m-mail messages to their family members and classmates. I knew their relationships with the people they were communicating with electronically and some general information about the content of these messages only because I overheard them talking about these messages with their friends who happened to be with them when the messages were sent or received.

I traveled to several European countries in 2001 and observed European mobile phone users as well. Generally, they talk on the phone everywhere, including in public transportation systems. There is no announcement in trains and buses requesting passengers to shut off the mobile phone, as is the case in Japan. In terms of text messaging, European users, just like their Japanese counterparts, send and check SMS messages everywhere. Even though Japanese mobile phone users rarely use the voice function in trains and buses, they use m-mail and other data features, such as games and

Web surfing, because sending and checking text-based data does not make sound and therefore is more socially acceptable.

After observing these fascinating m-mail phenomena, a few general questions came to my mind. Why does one send a text message, instead of using the voice communication feature of the mobile phone, to his/her family member in the same household? Why do teenagers, who see each other every day in school, exchange m-mail messages frequently? What impact does this kind of communication behavior have on their actual relationships?

Some say that the success of the mobile Internet in Japan is attributed to peculiar situations unique to the country. Examples include the following:

a) The low rates of PC penetration and Internet usage in Japan led to a cheaper and easier solution of the mobile Internet by women and teenagers (Cane, 2001).
b) It is cheaper to send m-mail over the mobile Net phone than using the PC-based, fixed-line Internet (Mizukoshi, Okino, &. Tardy, 2001).
c) Japanese spend a lot of time in crowded trains, and using the mobile Internet is one of the things they would do during their commute hours ("Japan firm," 2001).
d) Japanese tend to keep up with trends and get sucked into fads ("Japan firm," 2001).
e) Japanese youths have little private space inside home because the Japanese urban home is small and children share a room with siblings or parents. The mobile phone serves as a space for socialization without compromising freedom and privacy (Ito, 2001).

Yet, it is reported that teenagers in other cultures show a similar phenomenon. For example, a recent survey in the U.K. revealed that about 50% of all children in the country between age seven and 16 owned mobile phones and text messaging was becoming the favorite way of communicating with one another ("Half UK," 2001). On average, one sends 2.5 text messages and makes two voice calls a day. Teenagers in the Nordic countries often send over 100 SMS messages per month. "In Finland, more than

half of a teenager's mobile phone bill is made up of charges for short messages" (Nokia, 1999, p. 4). This assessment of m-mail use from the cultural perspective yields some insights in a large picture of communication behavior. By comparing users of m-mail in Japan with their counterparts in a European country, where SMS is popular, the differences and similarities found help us to better understand reasons behind this emerging communication behavior.

In order to examine the impacts of this new communication technology on the users in the context of interpersonal and small-group communication between family members and close friends, I studied users of m-mail in Japan and Sweden. Japan was chosen because the country's mobile communications use has remarkably grown in recent years. The mobile Internet in Japan began in February 1999 by NTT DoCoMo. The mobile Internet enables subscribers to use IP-based electronic messaging and Web browsing on the same mobile handset, in addition to the traditional voice communication features. Prior to the introduction of the mobile Internet service, SMS and pager systems capable of sending and receiving short text messages were available. Industrial analysts and business management experts have often examined the advanced Japanese mobile Internet market in comparison with the U.S. and European markets. The implementation of the mobile Internet in Japan, particularly that of NTT DoCoMo's, has been an oft-quoted success story. Japan launched the world's first third-generation (3G) broadband mobile communication service in October 2001, making transmission speeds much greater. Another reason for choosing Japan is that it is a highly industrialized, non-Western country with a unique combination of modernity and tradition. The communication behavior of the Japanese is different from that of the West in various aspects, as scholars in multiple fields have indicated.

I have chosen Sweden to compare with Japan because, though Sweden is a small country with 8.9 million people, it has been one of the leading countries in mobile communications since it began analog mobile telephone service in the early 1980s. At the end of June 2001, the penetration rate of the mobile phone was 75%, up from 58% at the end of 1999, and 71% from the end of 2000 (Swedish National Post and Telecom Agency, 2001). Although the text messaging service has been available since 1993-

1994, the use of this service became visibly popular over the past few years. During the year 2000, about 494 million SMS messages were transmitted from mobile phones in Sweden. In 1999, the number was 141 million. Obviously, the increase in SMS messages far exceeded the mobile phone penetration growth rate. Sweden is among the highest in the world in penetration of the Internet as well--2.4 million residential subscribers or about 50% penetration in households (Swedish Post and Telecom Agency, 2001). Thus, it is a "wired" Western country with characteristics contrasting with Japan. See site information of Japan and Sweden in Appendix A.

The family structure in Sweden is also different from that in Japan. In Sweden, when children become 18 years or so, they leave their parents and start living alone. Family members are scattered. In Japan, on the other hand, it is common that a family of three generations lives under one roof. This variance may be one of the factors that produce different communication patterns between the Japanese and Swedish m-mail users.

This study examines how people in these two countries use m-mail, in addition to, and sometimes instead of, face-to-face and telephone conversations for maintaining interpersonal relationships.

1.2.2 Research Questions

The growth and demands of mobile text messaging are so significant that they require research not only by the telecommunications and mobile-commerce industries but also by academic researchers, especially from the user's viewpoint.

This study strives to answer the following specific questions. The first question examines whether the nature of the relationship between two communicators is related to the users' m-mail use behavior (i.e., the frequency of exchanges and message content).

RQ1. Does a mobile text messaging user exchange m-mail a) more frequently and b) with sociable content more often with the people whom the user perceives psychologically closer?

The second question involves a consequence of m-mail use, in terms of its contribution, or lack of it, to deepening relationships, perceived by the user.

RQ2. How are the mobile text messaging users' social networks or interpersonal relationships changed, if any, from the users' viewpoints, since they started using this medium? Do the users perceive if the medium helps them to enhance interpersonal relationships or contributes to superficial relationships?

The third question deals with possible factors for in-country variance.

RQ3. Do the patterns found in RQ1 and RQ2 vary by demographic variable (e.g., gender, age and occupation) and by type (i.e., varied attitudes toward interpersonal communication and the use of m-mail) within a single culture?

The fourth and last question is concerned with possible cultural variance.

RQ4. Are any aspects of m-mail users' communication behavior and usage patterns found in RQ1 and RQ2 attributed to culture? In other words, do variations of communication behavior or usage patterns between Japanese and Swedish users, if any, derive from their cultural differences rather than service-specific differences?

The unit of analysis is individuals' m-mail use relative to the use of face-to-face and telephone conversations and e-mail. The m-mail users' usage patterns and their relations with actual interpersonal relationships are examined.

1.2.3 Definition of key terms

A few words and phrases require some explanations because they are key concepts in this study. The terms are alphabetically ordered.

e-mail

In this study, e-mail refers to electronic text messaging on the PC, differentiated from m-mail. "An e-mail system uses computer text-processing and communication tools to provide a high-speed information exchange service" (Sproull & Kiesler, 1986, p. 1493). Such mail exchange systems may be Intranet- (private or proprietary, closed network) or Internet-based.

GSM (Global System for Mobile Communications)

GSM is the world's first digital mobile communications system (Sempere, 1997). The European Commission intentionally made GSM as a means to create a mass market. Commercial GSM offerings began in December 1991 with Vodafone of the U.K. and Radiolinja of Finland (Commission, 1994). Several commercial GSM services began in Asia Pacific and Middle East at the end of 1993 (Eberspacher & Vogel, 1999). In October 2000, 397 million mobile users were estimated to be using GSM and its variants worldwide, of which 255 million were in Europe (GSM Association, 2000). GSM and its variants accounted for 68.5% of the world's digital mobile communications market and 60.6% of the entire mobile communications market. More than 400 mobile operators in 162 countries/areas offer GSM (GSM Association, 2001b). While two other largest markets, namely the U.S. and Japan, implemented different standards, GSM has become the de facto global standard for mobile communications.

Immediacy, intimacy

Immediacy is a multidimensional, multichannel construct, describing a quality and behavior of human communication. It is a state in which one feels closer to the other physically and psychologically. It is also a signal for availability for communication. It increases sensory stimulation and conveys interpersonal warmth and closeness. It can be communicated verbally, through word choice and sentence structure, as well as non-verbally by such behaviors as eye contact, physical proximity, and facial expressions. The term "intimacy" is used almost interchangeably, except that this word is more connotative than immediacy (Andersen, 1985). The level of immediacy and intimacy is to some extent determined by social norms, situation, and personality (Argyle & Cook, 1976).

Maintenance (of interpersonal relationships)

Relational maintenance behaviors are actions used to sustain desired relationships. They may be either strategic or routine, and interactive or non-

interactive, and vary according to the stage and type of relationship. Maintenance focuses "on relational stability, satisfaction, and important characteristics, such as commitment, that are critical to personal involvements.... connotes both a stage of relational development and the dynamic processes involved in relating" (Canary & Stafford, 1994, p. 3). It is often viewed as a stage of relational development and a goal for most people: They desire long-term, stable, and satisfying relationships. Canary and Stafford (1994) argue that some relational dimensions, such as trust, liking, and control mutuality (i.e., agreement on who has the right to influence the other), are universal to all relationships. Their propositions on maintenance include (1) "All relationships require maintenance behaviors or else they deteriorate" and (2) "People are more motivated to maintain equitable relationships than inequitable relationships" (p. 7).

Mobile Internet

In addition to the traditional voice features, the mobile Internet phone provides subscribers with text messaging and Internet (browsing) capabilities. In Japan, for example, users can send and receive messages and have access to thousands of specially formatted Web sites, including chat rooms, games, town guides, banking, ticket reservations, horoscopes, calendars, and customized news, all from a sleek, 90-gram cell phone ("i-modest," 2000). Many handset models have color screens for easier reading. The mobile phone has emerged as an alternative tool for Internet access. Japanese mobile Internet users, unlike European GSM users, are always connected to the Internet ("always-on") as long as signals can reach and batteries are not out. On October 2001, NTT DoCoMo began offering the world's first broadband (known as 3G or the third generation) mobile communication service, which enables users send and receive large data and motion pictures.

SMS (Short Message Service)

Buckingham (2000) defines SMS as

> the ability to send and receive text messages to and from mobile telephones. The text can comprise of words or numbers or an alphanumeric combination. SMS was created as part of the GSM Phase

> 1 standard. The first short message is believed to have been sent in December 1992 from a Personal Computer (PC) to a mobile phone on the Vodafone GSM network in the UK. Each short message is up to 160 characters in length when Latin alphabets are used, and 70 characters in length when non-Latin alphabets such as Arabic and Chinese are used. (p. 2)

International or cross-border SMS roaming service is available if the user's GSM network operator and the other's mobile network operator have a roaming agreement and both operators' networks support SMS (Buckingham, 2001)

1.2.4 Cultural differences between Japan and Sweden

Japan is often categorized as a high-context culture in comparison with low-context cultures, such as the U.S. and Sweden. The term "context" has multiple dimensions, but for the purpose of my study, the most fundamental aspect of it is the degree of social bonding. People tend to have stronger ties in high-context cultures than in low-context cultures. However, high- and low-context cultures cannot be always placed in a fixed position in the single continuum. Hall (1976) has observed that the Japanese are both high- and low-context depending on the situation and relationship. He describes these two directions, as follows:

> The first is a very high-context, deeply involved, enveloping intimacy that begins at home in childhood but is extended far beyond the home. There is a deep need to be close, and it is only when they are close that they are comfortable. The other pole is as far away as one can get. In public and during ceremonial occasions..., there is a great emphasis on self-control, distance, and hiding inner feelings. (p. 57)

People in low-context cultures generally "inclined to be more oriented toward achieving set goals and less toward developing close human relations" (p. 59). While the language in a low-context culture is explicit and elaborate, high-context communication is vague and expressed much part by nonverbal cues. The Japanese view of communication involves more than words (Maynard, 1997). "In the restricted code of intimacy in the home, words and sentences collapse and are shortened" (Hall, 1976, p. 80). A high-context person expects the other to know what his/her problem is without saying anything specific. One of the reasons for this taciturn behavior is racial

and linguistic homogeneity and another is the historical fact that talkativeness was not appreciated during the long feudal era (Tsujimura, 1987). Although Japan is not the only country where "people behave differently depending on whether their relationship is intimate or whether they are exposed to the public eye," changes in communication strategies by social contexts is linguistically explicit (Maynard, 1997, p. 33). In addition, high-context cultures tend to make greater distinctions between in-group (insiders) and out-group (outsiders) than low-context cultures do.

Another characteristic of the Japanese communication behavior, which does not exist in the West, including Sweden, is politeness. "The Japanese language has a built-in system of politeness strategies that requires a choice of appropriate politeness levels" (Maynard, 1997, p. 56). Tsujimura (1987) asserts that Japanese culture of Confucianism influenced social hierarchies. Japanese people must respect their seniors, elders, and those who are above them in social status. In communication, "the Japanese use different expressions and different words in daily communication according to one's position relative to others. They have different expressions between males and females and special expressions and words to show respect" (p. 116).

Indirect expression is also distinctive in Japanese. To express one's feelings, such as love, by poetic symbols rather than by direct statements is evidenced in traditional games and customs (Tsujimura, 1987). In the Waka (a 31-syllable Japanese short poems), for example, people never say direct, intimate expressions, such as, "I love you." Japan also has many verbal expressions of the indirect speech acts, compared with other cultures. For example, the utterance, "The door is open," could be indirect speech act requesting for a listener to shut the door. The Japanese in this example, instead of saying, "The door is open," say, "It is cold today," which is more indirect because this sentence does not mention the door. In another example, when someone says, "I will consider it for a while," during a negotiation, the listener understands that his/her proposal has been indirectly rejected (Okabe, 1987). In indirect speech acts, discrepancies between the literal meaning of the utterance and the real meaning the speaker intends may cause a serious misunderstanding between the two

communicators, unless the listener knows traditional rules of Japanese communication well.

Thus, the Japanese language seems to require more experience and skills to interpret accurately than the Swedish language.

1.2.5 Possible variations by age and gender

a) Age

Users of the mobile Internet are not only teenagers in Japan. In fact, the mobile Internet market attracts "adult users who get hooked on the system's grown-up content" (Landers, 2001, p. B1). NTT DoCoMo says that the average age of its mobile Internet service users is 28. This does not necessarily mean that the average age of m-mail users is also 28 because mobile phone ownership may not be translated into m-mail use. Most literature and industrial reports focus on the youth as the major and distinctive users of mobile communications technology.

A study of Japanese mobile Internet users has found that younger users tend to use m-mail more often than older users and that the voice-to-m-mail ratio is higher in older generations (Ohta, 2000b). Another study in the U.K. also has analyzed that younger people send more SMS messages than older people, except for those who are 16 or younger due to financial constraints (Faulkner & Culwin, 2001). The reason for this trend might be the youth's familiarity with electronic devices. Young people grew up with electronic devices such as computer games (including small-screen, portable game machines), virtual pets (e.g., Tamagocchi), robot toys, portable music players, and pagers, so that m-mail for them might be one of communication options they could adopt easily and quickly without hesitation. Older people, on the other hand, might feel they are out of place in electronic communication, requiring some more time before they become fully comfortable with this mode of communication.

Ling and Yttri (2002) agree that young people's attitude toward technology is different from their parents' and even their older siblings because the speed of technological change is far greater than the pace of change in human behavior and attitude. Tapscott (1998) calls these young people who were born after 1977 "the Net

Generation." He asserts that the Net-Gen is different from all others before it in terms of fluency with the digital media. Computers and the Internet are a fact of life for the Net-Gen. Young people understand that changes to their lives due to new telecommunications technology are inevitable (Gillard, Wale, & Bow, 1998). Older people may be more reluctant to change their existing routines, including communication patterns, while the youth could integrate new technology more easily in their daily activities (Greenwald, 1990). Thus, adults are not the only driving forces for the digital revolution.

Recently scholars and the telecommunications industry have realized that people under 30 are emerging consumers of mobile communication. The youth tends to adopt interactive, entertainment-oriented technology (Gillard, Wale, & Bow, 1998). Further, they have observed that

> Teenagers phone their school friends for long periods even though they spend a considerable amount of time with each other during the day. They speak of the content of their talk as fairly unimportant but what is important is making contact with friends for company, support and to relieve boredom. (p. 144).

Another study, a multi-country mobile user survey conducted in January 2002, indicates that the heaviest users of mobile text messaging are younger consumers and that over half of those under 25 use m-mail more than once a day (A. T. Kearney, 2002).

A study of interpersonal communication motives has found that younger people tend to use communication for pleasure, inclusion, and escape, while older people are more concerned with communicating affection. And these motives are associated with communication behavior (Rubin, Perse, & Barbato, 1988).

b) Gender

Behavior research in the West generally agrees: "men are inclined to share activities with their male friends whereas women prefer to share feelings with female friends" (Bell & Coleman, 1999, p. 13). More women than men think that a friend is someone they can talk to freely about anything (Willmott, 1987). Also, men are considered to emphasize instrumental action, which is a less personal form of

interaction than women's self-disclosure behavior (Swain, 1989). These gender differences in communication style may be also true in mediated communication. Little gender differences in m-mail use have been studied. However, a number of studies and observations of telephone and computer-mediated communication (CMC) users are available. They might shed light on gender variance in m-mail.

The literature of telephone sociability shows that women traditionally called more often for sociability. For example, Martin (1991) argues that women played a significant role in the development of the telephone by forcing the industry into accepting new and unexpected uses of the system. Maddox (1977) states that, for some women, the telephone was their best friend. Fischer (1992) gives three reasons why women historically used the telephone for social interactions more often than men: a) the telephone helped women to break isolation from adult contact during the day, b) married women have had the role of the social administrator, and c) women are generally more sociable and therefore more comfortable on the telephone than men. It was commonly thought that women made most social calls and that their conversations were not serious. Marvin (1988) has pointed out, "In contrast to men, women valued conversation that was redundant, frivolous, playful, and abundant" (p. 24).

The 1991 Gallup survey of cellular phone users indicated that more women than men said the technology made them feel more safe and secure, improved their relationship with their spouse and children (Rakow & Navarro, 1993). Interviews with women conducted by Rakow and Navarro (1993) found that women tended to use their cell phones "for personal reasons or domestic responsibilities, even if they were employed" (p. 151). People have ideological notions that women are less mechanically inclined and are more vulnerable to violence than men, leading to the gendered roles of men and women--women need the protection of men. Another theme came up in the Rakow and Navarro (1993) feminist study is "that mothers should be the primary caregivers for children and should be constantly available to them" (p. 153) with the help of the technological capabilities of the cell phone.

Social networking studies also indicate that women have larger and more complex networks than men (Ling, 1998). The themes have been that men tend to use

the telephone for functional matters and that women use it to integrate their social networks. Ling's (1998) study has revealed that women have longer conversations and use the telephone for a broader range of social interactions than men, and that women are interested in and positive toward social activities using telephony but less enthusiastic about technology than men.

Kopomaa (2000) indicates that girls are more committed to intimate, emotional communication than boys by using more special signs, such as smileys, in their messages. It has also been observed that boys tend to write in a more direct, straightforward way than girls. A SMS user survey in the U.K. shows that females send more messages than males (6.3 vs. 4.8 a day) (Faulkner & Culwin, 2001).

Not all research concluded women's domination of social use of communication technology. Several studies of Australian teenagers' uses of the telephone have found little gender differences (Gillard, Wale, & Bow, 1998). "The idea that males do not talk at length to friends or use the phone for socializing has been dispelled by the fact that large numbers of Australian men and boys use it precisely for these purposes. Gender stereotypes will have to be modified in this area" (p. 144).

During early decades of CMC development, some people had "the belief that computer networks would neutralize gender and other status-related differences and empower traditionally underrepresented groups" (Herring, 1996, p. 116). Herring's (1996) investigation of message posting behavior has found not only gender-neutral behavior but also reproduction and exaggeration of gender differences.

The 1999 statistics of the Ministry of Posts and Telecommunications of Japan show that more men the women own mobile phones in Japan (MPT, 2000a). However, the numbers include all types of mobile phones--60% did not have the m-mail capability. Also, it is possible that many male users are corporate users: that is, companies provide cell phones to managers (mostly males) for business use. The gender ratio of mobile Internet phones is unknown. One account suggests that the majority of mobile Internet users in Japan are women and teenagers who do not have fixed-line Internet access (Cane, 2001). In the U.K., more girls than boys have their own cell phones ("Half UK," 2001). From the gratification perspective, the telephone

use study conducted by O'Keefe and Sulanowski (1995) found that more women than men seek sociability.

Thus, prior studies of the telephone, mobile phone and CMC suggest possible differences in m-mail use by age and gender. Occupation is another seemingly obvious variable that makes a difference in m-mail use. Students may communicate with only their schoolmates by m-mail, while older professionals, particularly those who are self-employed, may have to utilize m-mail to communicate with their business associates and clients. This study therefore includes an examination of variations of communications behavior by these demographic variables.

1.2.6 Scope and assumptions

Since e-mail has been one of the applications of the Internet for over 30 years, individuals' Internet experience, or lack of it, may influence if and how they use the mobile Internet, and further what kinds of gratifications they seek from it. A vast amount of research has been conducted to investigate CMC. E-mail is one of the applications of CMC. Some studies argue that CMC is less personal than face-to-face communication because of the lack of nonverbal cues in CMC, while others have found that e-mail is equally effective to form and maintain relationships (Walther, 1992; Stafford, Kline, & Dimmick, 1999). A question remains as to how people differentiate m-mail from e-mail.

The scope of this study excludes e-mail use on the PC as well as use of text messaging for business purposes. One of the assumptions made here is that communications over the private mobile phone, whether it is voice or text, is highly personal and sociable, less formal and task-oriented, and urgent, compared with sending and receiving e-mails on the PC. Content on a message would often require the receiver's immediate attention. The length of a m-mail message must be shorter because of technological restrictions. Users probably have developed their own cryptic writing styles to minimize their phone bills, reduce the amount of text on a small cell phone screen, and increase their communication effectiveness. With the exclusion of the wire-line Internet, the study focuses on personal electronic messaging.

Another reason not to include the wire-line Internet in this study is a practical one. It is highly probable that many m-mail users do not have home PCs because the Internet penetration rate in Japan is significantly lower than that of mobile phones. At the end of fiscal 2000, 34% of Japanese households had Internet access, while 75.4% of households had at least one mobile phone (Ministry of Public Management, Home Affairs, Posts and Telecommunications of Japan[2]; MPT, 2001). A survey found that 60% of NTT DoCoMo's i-mode users did not have access to the Internet from a PC, while 40% used the Internet from both the i-mode phone and the PC (Ohta, 2000b). Many schools do not have Internet access. At the end of fiscal 1999, 48.7% elementary, 67.8% junior high, and 80.1% senior high schools had access to the Internet, and each school has only a small number of PCs (14 to 44) (MPT, 2001). It is very likely that some mobile Net users in Japan think that the scaled-down Internet service on the mobile Net they use on the small screen is the Internet. More importantly, many users' first experience with e-mail is the short message service on their cell phones.

The focus of this study, from the perspective of the communicators' relationships, is how m-mail is used for communications between family members who live in the same household as well as between close friends who see each other almost every day (Monday through Friday, for example) in the real world. The word, "friends," may mean different things for different people. The minimum requirement of friends for this study is that they must know each other well enough to have conversations on personal matters and to do so without negative or hostile feelings. Other types of relationship (e.g., relatives, teachers, and neighbors) as well as friends whom they rarely meet face-to-face and family members living at distant locations are assessed accordingly where necessary.

Technological aspects are not emphasized in this study, as not many users probably know or care what technology is used behind the service. Cost-related issues are particularly critical when many people cannot afford mobile phone subscription. Affordability, however, does not seem to be a significant problem in either Japan or

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[2] The Ministry of Posts and Telecommunications of Japan was integrated into the Ministry of Public Management, Home Affairs, Posts and Telecommunications in 2001.

Sweden because handsets are low cost and the service is relatively inexpensive (Cane, 2001). Questions involving social and psychological factors, such as how people differentiate m-mail from other types of communication modes and use m-mail for their own interpersonal purposes are much harder to predict. This is the area of interest in this study. Observations of users' attitude toward the communication form and their usage behavior--how they are using it, why they like it, what impact it might have on relationships, and so on--should help to better understand how this new communication mode will evolve and change our communications behavior in a longer term.

Although the mobile Internet phone also enables users to visit specially formatted Web sites for information, banking or reservations, participate in electronic bulletin boards/chats, play games, receive headline news automatically, and so on, these applications are not be examined in this study. The focus is on electronic text messaging.

1.2.7 Significance of Research Questions

Some mobile Net phone users in Japan bypassed home PCs and the fixed-line Internet. School children in Scandinavia do not use e-mail much and communicate with each other via SMS (Kopomaa, 2000). Users exchange m-mail messages mainly with their family members and close friends. The text messaging function of the mobile phone may drastically change the way we have been interacting with friends and family.

The telephone was invented 126 years ago and the Internet is 32 years old, while the Japanese mobile Internet just had its third anniversary. SMS use has been noticeably popular only for a few years. It is interesting to study subscribers to this phenomenally popular communication service because all of them are new users and they are creating a distinct culture of digital information exchange. The mobile phone has emerged as an alternative tool for Internet access.

This study identifies possible explanations why mobile phone users use text for interpersonal communication despite the fact that the voice communication feature is also on the same cell phone they carry around. How do users view this non-vocal, text-based communication mode vis-a-vis face-to-face and telephone conversations when

they communicate with friends and family? The existing wireless e-mail system (i.e., second generation or 2G) lacks audio and visual cues (i.e., it cannot send moving picture yet) and provides less interactivity than the telephone or face-to-face communications. What aspects of m-mail may contribute to interpersonal relationship development? The only communication options they had prior to their adoption of m-mail were face-to-face communication, the telephone, voice mail (answering machine), and letters/cards. Some people might view m-mail as a replacement of voice communication, while others might perceive it as a supplement to phone calls or even face-to-face conversations.

This study also helps to better understand in which directions people's perceptions about e-mail may be shifting. It is critical to study how users feel about e-mail vis-à-vis other communication modes because if users are pleased with the way they currently communicate with friends and family, it would be an indication that more people will likely use e-mail for intimate communication in the future. Little research has been done regarding user effects of non-vocal messaging among family members or close friends.

Throughout history, the field of communications has encompassed a large number of media and technologies for study due to processes of invention and innovation. The mobile Internet is at an early stage of consumer adoption but is clearly a technology directed at the mass consumer market. In the countries where the mobile Net phone has not been widely used, like the U.S., might see the same or similar phenomenon in the near future. The impact of the communication behavior change could be tremendous because of the sheer number of users of such devices worldwide. Market research studies predict that 500 million cell phones will be in use by the end of 2001 and that the number will grow to over one billion by 2005 (Frenzel, 2000). And 62% of them will go online wirelessly by year-end 2005 (eTForecasts, 2001). It is important to understand how new technology might impact people's communication behavior and interpersonal relationships. This study provides an opportunity to contribute to an important--albeit relatively new--innovation in the human communications arena.

Mobile text messaging is relatively new and very little has been done in the area of user effects research in the academic field. Therefore, this study is exploratory in the sense that it will serve as a first step toward a better understanding of user effects of this medium. However, an attempt is made to suggest probable tendencies and directions of m-mail users through theories, research questions, and measurements.

CHAPTER 2: LITERATURE REVIEW AND CONCEPTUALIZATION

It is unlikely that a single theory can explain why and how people use mobile text messaging to communicate with friends and family, as communication behavior is multidimensional. Usage may be dependent on the situation or context. Also, relationships between communicators are related to the channels, languages, and styles of interpersonal communication they employ. Literature in several fields would help better understand m-mail as part of human communication. This literature section first presents key characteristics of m-mail, compares m-mail with other modes of communication, and then reviews theories on interpersonal relationships.

Tens of millions m-mail messages are sent every hour worldwide. Children and adolescents are said to have quickly adopted the new way of communication. But why is this phenomenon becoming part of everyday communication for at least some groups of people? And what advantages do users perceive over the existing interpersonal communication media? To answer these questions, it is essential to consider the key characteristics of m-mail and compare this communication mode with other modes.

2.1 Essential Characteristics of M-mail

M-mail inherits its characteristics from a) computer-mediated communication (CMC), and b) mobile phone (excluding the voice dimension). Prior CMC studies (Rafaeli, 1986; James, Wotring, & Forrest, 1995; Jones, 1998) and mobile phone literature (Roos, 1993; Kopomaa, 2000; Cooper, 2001) suggest several characteristics distinct to these types of communication. Although most of the characteristics listed below can be applied, in varying degrees, to both CMC and the mobile phone, and it may not be an exhaustive list, I believe this list sufficiently represents major characteristics of each medium.

a. CMC characteristics common to m-mail

- Virtuality

- Time and space independence
- Asynchronicity (delay)
- Interactivity
- Lack of sensory (nonverbal) data

b. Mobile phone characteristics common to m-mail

- Mobility or portability
- Accessibility or constant availability
- Personal nature or privacy

c. Ritual communication

I would like to add ritual as a characteristic of m-mail. Any communication mode has a ritualistic aspect, but this dimension seems to be particularly noticeable in m-mail.

2.2 Explanations of Each Characteristic

2.2.1 Virtuality

CMC creates a virtual space through which people seem to construct their own realities. In other words, the construction of realities occurs not only in the actual life but also in the virtual world. CMC is a combination of technology, medium, and engine of social relations. It is not just a tool. Relations occur in the electronic network (Jones, 1998). Jones (1998) states that CMC "brings us a form of efficient social contact: it rolls efficiency and social contact into one" (p. 11). He calls the new social formations on the Internet "cybersociety." Other scholars call this notion "virtual community" (Foster, 1997; Rheingold, 2000), "electronic frontier" (Healy, 1997; Rheingold, 2000), "cyberspace" (Gibson, 1984; Connery, 1997), and so on.

Virtual communities, unlike geographically local communities, are based on the voluntary association of the like-minded individuals (Baym, 1998). The definition of the term "virtual" is somewhat ambiguous. Some scholars regard this state as "not real or authentic" (Wilbur, 1997). But according to Levy (1998), the virtual is not the opposite of real but a powerful mode of being. "The word 'virtual' is derived from the Medieval Latin *virtualis*, itself derived from *virtus*, meaning strength or power" (Levy,

1998, p. 23). The virtual is a mode of existence. But it is not a manifest state or actual existence but rather a potential.

Our traditional belief is that the reality our eyes perceive in face-to-face communication is more real than the reality we perceive in other media (Jones, 1998). However, it is becoming impossible to definitively classify experience as "real" or "not real." The frames we used to set the real apart from the unreal are no longer useful, requiring new concepts and understanding (Chayko, 1993). The social construction of the reality is constituted in the networks (Jones, 1998). In a personal social network in the virtual world, like in mobile text messaging, users reorganize their social relations around a new technology.

2.2.2 Time and space

Telecommunications technologies since the implementation of the electric telegraph in the 1840s have changed the spatial and temporal boundaries of human communication. Before the telegraph became available, communication was identical to transportation (the movement of goods and information) (Carey, 1989). Communication has since then become "a process whereby messages are transmitted and distributed in space for the control of distance and people" (p. 15). Technologies "'eradicated' space and shrank time, thus creating 'the vast extended present of simultaneity'" (Kern cited by Fischer, 1992, p. 10). See asynchronicity and accessibility below.

Physical distance between people does impact on their communication behaviors. Sociologists and philosophers have debased on communities and concluded that modern society has disrupted people's natural, geographically-based relations to one another, loosened commitments to kin and neighbors, and have been disintegrated into alienated individuals (Fischer, 1982). One of the findings of Fischer's (1982) community study is that "distance is intrinsically and overwhelmingly important" (p. 158) because distance is closely related to frequency of FtF meetings. However, he could not find the relationship between frequency of FtF meetings and the level of intimacy.

> The farther away respondents lived from an associate, the less often they got together with him or her. How important frequency of contact is, in turn, as a cause of intimacy and support is not at clear. The results presented here suggest that it is not critical; it may, in fact, be more a consequence than a cause of closeness. (p. 158)

Another author proposed: "physical proximity does not always lead to the establishment of social relations" (Stacey, 1974, p. 23).

2.2.3 Asynchronicity (delay)

Asynchronicity can be another way of expressing time- and space-independence nature of communication mode but from a different angle: asynchronous communication is not sequential, real-time process that people experience in face-to-face (FtF) interactions. Because of this, the asynchronous (delayed) communication mode of CMC is often viewed as a problem (Turoff, 1991; Pratt, Wiseman, Cody, & Wendt, 1999). In this mode, messages are broken into pieces (packets) and each one is sent from the sender to the receiver via various paths and usually multiple hops. As a packet is forwarded from one network node to the next, transmission and processing delays occur. An advantage of asynchronicity, however, is that this mode provides the user with control. FtF takes place only if two people communicate at the same place at the same time, which can be a strength and weakness. If the communicators' schedules do not match, they cannot participate in a FtF session.

Time cannot be manipulated in FtF. In FtF, every moment counts including silence and pauses (Chesebro, 1985), and "a person can and must respond immediately to communications received, or it is 'too late'" (Hiltz & Turoff, 1993, p. 29). In CMC, on the other hand, time can be more directly controlled. It allows two people to stay in contact even if they work at different hours or live in different time zones. Delays may create frustration during an online chat, but this delayed time provides users with more time to think, plan, and edit a reply (Chesebro, 1985; Walther, 1996). In my interviews with m-mail users in Tokyo and Stockholm, I have found that they understand this mode of operations and that they use m-mail when the interaction does not have to be real-time. They are happy if they get a reply within a reasonable timeframe.

2.2.4 Interactivity

Some use the word "interactivity" synonymously as "feedback" (Jones, 1998). But Rafaeli (1988) argues that full interactivity must meet two criteria: message sequence depends on the reaction in earlier transactions as well as on the content exchanged. Interactivity is not just turn-taking, back-and-forth exchanges. It should have both the dynamic interaction and relevance or coherence of the content of the conversation (dialogue). It is not a medium characteristic, although media channels may set upper bounds or conditions for interactivity (Rafaeli, 1988). Interactivity as a form of social interaction could bring a number of derivatives including sociability, satisfaction, and sense of fun. Interactivity is most known in FtF, but it can also happen in mediated communication.

Misztal (2000) explains that "the main function of exchange is the creation of feelings that can result in an atmosphere of reciprocity and mutual obligation....involves mutual expectations....seen as responsible for their participants' ability to cooperate for mutual benefit" (p. 80). He continues to argue: "reciprocity proved to be a relatively common phenomenon online, even between people with weak ties" (p. 196). Kopomaa (2000) states that text messaging is interactive and mutual. M-mail also invites a speedy reply. His observations agree with the results of my interviews conducted in Tokyo and Stockholm in summer 2001. People would not respond so quickly over e-mail or the telephone. The reasons for such a high level of interactivity in m-mail are likely: a) users are communicating with their close friends, and friends talk to friends often; b) users are carrying their mobile phones all the time (which is linked to accessibility and availability described below).

2.2.5 Lack of sensory data

Most of the literature discusses CMC in comparison with FtF (e.g., Chesebro, 1985; Walther, 1996). They have pointed out the lack of nonverbal cues (e.g., facial expressions) as well as vocal quality (e.g., pitch and tone). Prior models of media choice (e.g., the social presence model, media richness theory, and cue-related theories)

rate CMC "lean" and FtF "rich" mainly because much more information about the communicators is available when people communicate in the FtF mode than online exchanges. However, a number of studies suggest that most of the CMC applications, such as e-mail and bulletin boards, are effectively used for socioemotional purposes (Chesebro, 1985; Rice & Love, 1987; Flanagin & Metzger, 2001). "Socioemotional content is defined as interactions that show solidarity, tension relief, agreement, antagonism, tension, and disagreement" (Rice & Love, 1987, p. 93). Rice and Love (1987) have found that more active CMC users send more socioemotional content. See more on media attributes below.

2.2.6 Mobility and portability

One could intuitively and easily assume that carrying a mobile phone anywhere the user goes would make a difference because the user can be always connected to a wireless network. Where the user is right now is the 'place' he/she can communicate with anyone he/she chooses. With a fixed computer, the user needs to be a certain location where he/she can go online. With a fixed telephone, one needs to be at home or office or find a pay phone. The portable nature of the mobile phone also enables users to utilize their idle time (e.g., while waiting for someone, and commuting in a train) more effectively. Users can even use m-mail while they are doing something else (e.g., walking, eating, and meeting). The social meaning of the mobile phone does not ultimately reside in the fact that it is portable, but in how and why it is used (Kopomaa, 2000). Nevertheless, users' freedom of movement gives flexibility for communication time and space. This feature is closely related to accessibility (see next section).

2.2.7 Accessibility and availability

As stated above, telecommunications technology is often said to have conquered temporal and spatial restrictions. However, one may not be able to be connected 24 hours x 7 days unless he/she has a portable mobile communication device. The mobile phone provides users with constant accessibility regardless of time and physical location (Kopomaa, 2000). The user, however, has an option to switch off the device

with a push of a button, when he/she does not want to be bothered, or can ignore rings when he/she does not feel like talking to the caller (judging from the caller ID appeared on the screen). Thus, the user can determine and control the degree to which he/she makes accessible or available to other people. The user, that way, can define his/her own social network, which coincides with his/her mobile friends (Kopomaa, 2000). People want to share moments, feelings, and observations with their circle of friends without waiting for the next opportunity to communicate.

Accessibility or availability, however, involves paradoxical aspects. Being available can be seen in a positive light, but it can be potentially privacy invasion and oppression (Cooper, 2001). While adults may feel stressed by constant availability, teenagers thrive on access and interaction (Ling & Yttri, 2002). For working adults, the difference between work and leisure is blurred when one makes available in the evenings and on weekends. Constant accessibility may result in liberation, dependence, or both. People without mobile phones, and therefore are not accessible all the time, may be potentially excluded from some social relationships (Raty, 2000).

2.2.8 Personal nature or privacy

With the use of the mobile phone, the user can turn a public space into his/her own personal space (Kopomaa, 2000). M-mail messages are by their very nature (i.e., written format) completely private. Unlike the PC or home phone, a mobile phone belongs to an individual and is not usually shared among multiple people, so that one can expect direct, one-to-one communication. Only the addressee receives the message, meaning that a sender can send a private, intimate message without suspecting that the receiver's family members (especially parents) or colleagues (or bosses) might receive it.

Contrary to these general perceptions, however, a study of Weilenmann and Larsson (2001) of Swedish teenagers has found that the mobile phones are not necessarily treated as personal devices and the calls and SMS messages are not always private. Teenage mobile phone users share the contents of messages with their friends who are co-present. For example, users share SMS messages by reading the content

aloud or showing the display to others. Not only the content, but also the mobile phone itself is shared sometimes. Their study concludes that at least for teenagers the notion of the mobile phone as a private device does not apply. The mobile phone is rather a collaborative resource for them. This particular phenomenon may be limited to young people who go out to a public location with a group of friends and share private information among themselves. But it indicates that the boundaries between the private and the public may be further changing.

2.2.9 Ritual nature

In the ritual view of communication, communication is linked with terms such as "sharing," "participation," "association," and "fellowship." This view is directed toward the maintenance of society in time and the representation of shared beliefs, and not transmitting knowledge or information from a sender to a receiver (the transmission view of communication) (Carey, 1989). Communication as a ritual is concerned with how people live with communication practices. In ritual communication, content matters less than the participation in the communication activity (Soukup, Buckley, & Robinson, 2001). Ritual activity is not a mindless, senseless repetition of action but a mindful, conscious action through which people construct their world (Jennings, 1982; Rothenbuhler, 1998).

Ritual is important and meaningful socially. But ritual does not have to be a long, elaborate action. Simple greetings and parting forms are examples of ritual communication (Rothenbuhler, 1998). Ritual communication takes place among friends as well as family members. The content of the messages exchanged between m-mail users may be labeled trivial or superficial, but even small talk enables people to stay in touch (Kopomaa, 2000).

According to Duck (1994), relationships

> keep going because they are filled with juicy meaning for the partners....created in talk and the mere occurrence of talk in everyday relationships not only satisfied the partners that the relationship exists and is important irrespective of the content of the talk, it also reifies, sustains, and produces the relationship....perpetuation of the relationship

> through talk [is] more important than any self-disclosing or other "significant" content of the talk. (p. 51)

Duck (1994) continues to argue that by holding silly and insignificant conversations about trivial topics, people achieve two things. First, people show their attitudes on variety of things, their way of looking at the world, their vision, and so on. Second, they collude with each other in the embodiment of the relationship. Thus, through the seemingly trivial talk, "people are signifying the essence of their relationships with each other and doing so because they share enough understanding of one another to make this mutual interpretation possible" (p. 54).

2.2.10 Other characteristics of CMC and m-mail

Playfulness, entertainment, and pleasure

Rafaeli (1986) in his electronic bulletin board system (BBS) study mentions "playfulness" as one of the motivations for the use of BBS. His observation is insightful because most of the existing CMC applications do have this characteristic. M-mail certainly has this dimension. Playing is voluntary and not a task or duty. Psychologists explain play in many terms but all seem to agree that it is "fun" (Stephenson, 1967). M-mail messages are more for fun than for communicating about a serious matter. One can send non-task-oriented messages to just please him/herself and the receiver (Kopomaa, 2000). M-mail is different from e-mail in this respect. In addition, m-mail exchange is more like playing with words. M-mail and the mobile phone increase spontaneous contacts, but only with people whose numbers are in the memory of the mobile phone (Raty, 2000).

Play may be linked to something more heuristic. Stephenson (1967) states, "Scholars before Huizinga considered play a degradation of real living, a waste of time, a meaningless mask. To Huizinga, on the contrary, playing is a source of culture" (p. 46).

A meta-analysis of interpersonal communication motives based on the uses and gratifications approach points out that one of such motives is entertainment. People engage in interpersonal communication partially because it is fun and enjoyable (Rubin,

Perse, & Berbato, 1988). Operationally, entertainment (e.g., fun, a good time, entertaining, and enjoyable) and arousal (e.g., exciting, thrilling, and stimulating) are combined to be the construct of pleasure. This pleasure motive seems to be close to playfulness conceptually. Playing must be enjoyable and pleasure. Pleasure is the result or expression of a relationship and viewed as a communication concept (Szasz, 1957). When two people converse, they may say afterwards that it has been pleasure talking. Their conversation may serve no apparent purpose, and a person may not get anything out of the other or expect anything from the other. Yet they say how much they have enjoyed it. This is communication-pleasure (Stephenson, 1967).

Anonymity

CMC allows users create or negotiate their identities. Users can post their messages anonymously and pseudonymously (Jones, 1998). Anonymity and altered identities are possible because CMC communication is mainly text-based and users cannot use nonverbal and vocal cues. (For more discussion on social cues, see below.) This dimension of CMC, however, is not applicable for many mobile text messaging users because m-mail is mainly used for personal communication between close friends or family members, and not between strangers or virtual friends whom they have never met offline.

2.2.11 Drawbacks and limitations

Mobile text messaging has a number of strengths. However, it also has drawbacks and limitations. Some of them may not be manifest at this time. Some of them may be the reverse of the known strengths. Here are some of the negative characteristics people have said:

Social and behavioral risks include the following (Kopomaa, 2000):

- Mobile text messaging (and the mobile phone in general) may further accelerate the pace of everyday life.
- The medium may create more social isolation and marginalization. Some people will be left out.

- People get addicted to m-mail.
- Decline of traditional interaction (even telephone calls)

Technological limitations often raised are the following:

- The maximum length is limited to 160 characters on the GSM phone or 250 Japanese characters.
- One must learn how to use a keypad, which is significantly different from a computer keyboard.
- Mobile phones do not have a printing capability. M-mail messages cannot be printed directly from a mobile phone.
- One cannot attach data files, such as Word and Excel files, to m-mail.
- One can save only a small number of messages in the memory of a mobile phone.

2.3 Modality - Comparison of Various Communication Modes

The major types of interpersonal communication modes are text-only, voice, video, and FtF. M-mail belongs to the text-only category. The telephone represents the voice category. Video conferencing is not yet widely used by regular consumers for interpersonal communication purposes, as it requires special equipment and a large-capacity connection. FtF is the only non-mediated interpersonal communication mode. This section discusses the FtF mode and the telephone in comparison with CMC/m-mail, reviews media attributes, and then compares m-mail with e-mail.

2.3.1 Face-to-face interaction

FtF interaction is often said to be ideal for interpersonal communication because of its high level of available bandwidth, interactivity, and immediacy (transparency). FtF contact is the very first mode of interaction known to all humans. Communicators rely heavily on the subtle, multichannel display of nonverbal behaviors to gain relational information from their partners (Palmer, 1994). The absence of information--the silence and pauses between words and phrases--is valuable, sometimes more so than words themselves (Jones, 1998). However, one must be aware that FtF communication

does not always breakdown social boundaries or facilitate understanding among people (Jones, 1998).

The multichannel nature of FtF interaction leads individuals to directly engage the other party with little concern for the physical medium they use. Immediacy and intimacy are some of the concepts to describe a cognitive and behavioral state in which individuals feel more or less directly present in the conversation (Palmer, 1994). Immediacy/intimacy is a multidimensional, multichannel construct and can be expressed through a combination of nonverbal and verbal communication actions, including eye-contact, physical proximity, tone of voice, amount of smiling, topic, word choice and sentence structure (Anderson, 1985). Intimacy "refers to relationships characterized by close association, privileged knowledge, deep knowing and understanding, sharing, commitment and some kind of love" (Misztal, 2000, p. 97). Intimate relations are sources of psychological satisfaction. Immediacy/intimacy is, to some extent, also determined by social norms--how people are to behave in certain situations. The level of immediacy/intimacy is determined by both situational and personal factors (Argyle & Cook, 1976). The level of immediacy is the greatest in FtF.

Technology cannot overcome barriers to interpersonal communication to match FtF interactions (Palmer, 1994). However, it is not likely that FtF, with the maximum level of bandwidth and immediacy, is always a useful or convenient form of communication in all situations. One can think of a lot of situations when he/she wants to avoid encounters with certain people.

2.3.2 Telephone

Telephone in general

The telephone cannot convey nonverbal and visual cues, which provide filtering functions in FtF communication (Hiltz & Turoff, 1993). Touch, the most intimate form of nonverbal communication, is absent in all forms of mediated technologies (Palmer, 1994). Despite its narrower bandwidth than FtF, the telephone allows "intimacy across spatial boundaries. Speed is a key advantage as well, as is the convenience of accessing interaction from home, office, or increasingly, wherever one happens to be" (O'Keef &

Sulanowski, 1995, p. 922). Telephone technology enables people to engage in a form of talk-in-interaction that would not be possible in other media (Hutchby, 2001). Hutchby (2001) calls this form of interaction "intimacy at a distance" (p. 83) and argues that "there seems to be little difficulty for humans in managing coordination even in the absence of visual cues" (p. 86).

Sociologists have been interested in psychological effects of the telephone. Ball (1968) indicates that calling someone is "somehow 'easier' or more appropriate than directly confronting the intended recipient" (p. 59) because the telephone reduces the level of embarrassment, compared with the FtF mode. In fact, people say things they would never say face-to-face (Aronson, 1971). Sociologists have observed that among the most likely functions the telephone provided were the reduction of loneliness and anxiety, the sense of security, and the ability to maintain family ties and friendship. Many urban residents formed the "psychological neighborhood" with their friends and family who lived in distant locations and who interact as much via the telephone as in FtF meetings (Aronson, 1971).

Another characteristic of the telephone is that initiating a phone call requires a greater motive, or sometimes more courage, than sending a text message. Researchers have described a ringing telephone as insistent, abrupt, and intrusive (McLuhan, 1965; Ball, 1968; Perry, 1977; Mitchell, 1981; Ling, 1997). One must consider timing of making a phone call so that hopefully it is not too intrusive, but this kind of consideration is unnecessary with text messaging. Answering machines and voice mail help overcome this intrusive nature of the telephone. In addition to the timing issue, the informal nature of electronic text messaging decreases tension and avoids embarrassment, which may be unattainable with voice (telephone) and FtF communication (Kopomaa, 2000). Sending a message for asking for a date, for example, may be easier with m-mail because a decline or non-response is less damaging for the sender, compared with a more direct, negative answer in telephone or FtF situations.

Individuals' telephone use motivations may include social, psychological, and instrumental needs, such as pleasure, affection, inclusion, escape, relaxation, control,

surveillance, information gain, purchasing goods or services, and scheduling. In the early years of telephony, however, the telephone was mainly a business tool. For the residential market, practicality was the telephone industry's basic rationale to motivate people to put telephones in their homes. The residential telephone would help people better manage household affairs (e.g., ordering goods) and cope with emergencies (e.g., calling for the doctor). The telephone industry regarded socialization as an abuse of the system. Nevertheless, subscribers kept using the telephone for trivial gossip (Fischer, 1988, 1992).

Voice communication function of the mobile phone

Besides differences in technologies used, costs, and the degree of portability, the mobile telephone and the fixed telephone are different from each other in a few aspects.

Privacy

Privacy is a multidimensional concept. Concern for privacy people might feel while they are using mobile phones is different from when using home or office phones. Elgesem (1996) suggests: "privacy comes in degrees" (p. 47). Private situations may occur within the scope of public situations, while being in our homes may not be a completely private situation. Privacy is important for maintaining personal relationships. If intimate information flows without one's control, the person may jeopardize his/her relations.

- A mobile phone user's response is audible to people physically near the user. Nowadays people often hear one side of a two-party conversation in public places. Ling (1997) calls this coerced eavesdropping.
- The person who answers a telephone call at home or office may not be the person the caller wants to talk to (Hutchby, 2001). A mobile phone is normally associated with one owner, so that a caller can expect a contact without an intermediary. An interview study conducted by Gillard, Wale, and Bow (1998) has found that the most important feature of home telephone use for teenagers is the possibility of holding private conversations with their friends, particularly for interactions

involving the opposite sex. Ling and Yttri (2002) also found that adolescents are aware that the mobile phone gives them the advantage of being outside the supervision of their parents.

- The mobile phone user would know who is ringing by checking the caller ID. The user may decide whether he/she takes the call or not based on the caller's name or phone number displayed on the screen.

The procedure or initiation of interaction

When one calls a telephone number of a fixed phone, he/she knows that the receiver's specific location (home, office, shop, and so on) and the caller must first identify hit/her name (Mitchell, 1981). Mobile phone users, on the other hand, typically begin their conversation with the information about the location the caller and/or the receiver is at the time of the call. They may ask to each other, "Where are you?", and end the conversation, "Got to go. Bye" (Raty, 2000). The caller may not begin a conversation with "This is so and so" because the called would know who is calling him/her. As explained above, the caller's name or phone number is displayed on the mobile phone screen of the called.

New form of interaction

With the use of the mobile phone, and m-mail particularly, the user does not have to decide in advance a specific time and place to coordinate activities with a friend. People can adjust arrangements at the last minute or as the needs arise. Ling and Yttri (2001) call this form of communication micro coordination. This is largely functional and instrumental use of mobile phone technology. M-mail messages are also used as a substitute for leaving voicemail messages (Kopomaa, 2000).

2.3.3 Media attributes

In cyberspace (CMC), communication is mainly text-based. A huge pool of literature and theories on CMC versus other modes of communication has been accumulated over the last 25 years or so. Most of them are concerned with the amount

and type of "cues" or "channels" as the key factor for differentiating media. Nonverbal cues have been generally considered crucial for interpersonal communications. Major earlier theories often quoted are media richness theory, social presence theory, and social context cues approach. Here are some descriptions of these theories.

Media richness theory

Media richness theory suggests that media can be ranked according to the level of richness. The criteria of richness are the number of cue systems conveyed, the immediacy of feedback, and the capacity of natural language (Daft & Lengel, 1984, 1986). Face-to-face communication is considered the richest, "given the availability of immediate feedback, the number of cues and channels utilized, nonverbal (facial and oral) backchanneling cues, and personalization and language variety" (Walther, 1992, p. 56). According to this perspective, CMC is lean, formal letters are the leanest, and other media, including the telephone, are moderately rich. Language in richer media is more personalized. The media richness approach provides some indication as to how each medium might be utilized. For example, when messages are simple and clear, CMC is sufficient for effective communication, while a richer medium is required for a receiver to understand ambiguous information (Daft & Lengel, 1984, 1986).

Social presence theory

"One of the most influential theoretical frameworks for analyzing mediated communication is the social presence model developed by the Communication Studies Group at University College, London (Short et al., 1976)" (Spears & Lea, 1992, p. 31). Social presence is defined as a quality of the medium itself. But at the same time, the social presence of a medium is conceived as a perceptive or attitudinal dimension of the user, a mental set towards the medium (i.e., to what extent the others presence is felt by the user). Operationally, social presence has a number of dimensions and can be assessed by semantic differentials, such as unsociable-sociable, insensitive-sensitive,

cold-warm, and impersonal-personal. The concept is also closely related to intimacy and immediacy.

Communications media can be ranked by the degree of social presence. Media having a high degree of social presence are judged as being warm, personal, sensitive, and sociable (Short, Williams & Christie, 1976). The highest rank is face-to-face communication. The telephone is ranked in the middle, while e-mail is lower than the telephone. Spears and Lea (1992) explains that "the greater the social presence the more likely that communicators will be able to bring all their powers of persuasion to bear and exert influence" (p.32).

Social context cues (cuelessness, and reduced cue) approaches

The cuelessness model, unlike social presence theory, "was originally defined as an information-based rather than a phenomenological concept" (Spears & Lea, 1992, p. 33). Nonetheless, operationally this model is similar to media richness and social presence theories. It advocates that face-to-face communication is rich in interpersonal cues, and therefore socially rich. CMC is considered as relatively cueless. In later studies of cuelessness, the concept has become closer to social presence theory as it believed to affect communicators' behavior indirectly, mediated by psychological distance. The argument goes that a combination of cuelessness and psychological distance generates task-oriented and depersonalized content, which leads to less compromise. However, this model does not explain why sound-only conditions are sometimes more influential than face-to-face communication.

Some scholars argue that the absence of social context cues in CMC leads to the phenomenon called 'flaming' (i.e., making uninhibited remarks, such as swearing, insults, name-calling and impolite statements) (Lea, O'Shea, Fung, & Separs, 1992; Sproull & Kiesler, 1986). Social context cues include "geographic location, organizational department, hierarchical position, job, age, and gender" (Sproull & Kiesler, 1986, p. 1498) of others. The function of social context cues is thought to "create and elicit cognitive interpretations and concomitant emotional states....When social context cues are weak, people's feelings of anonymity tend to produce relatively

self-centered and unregulated behavior" (p. 1495). Some experimental studies found that uninhibited remarks were made most often in anonymous CMC, second-most often in the identifiable CMC environment, and none in the face-to-face condition. The most widely accepted explanation for these observed differences are the reduced social cues.

Alternative approaches

All of these media choice models described above are the so-called cues-filtered-out perspective. From this perspective, all CMC would be expected to be less personal and less socially oriented. This perspective also assumes that people choose a medium rationally on the basis of its technical function (Daft & Lengel, 1984; Trevino, Lengel, & Daft, 1987). Earlier studies of CMC, based on this perspective, demonstrated that the use of e-mail reduced interpersonal affect and group solidarity (Walther, 1996). It must be noted that these theories do not consider context and function of communication processes (Walther, 1992).

Over the years, research has accumulated counter-examples and alternative findings (Kerr & Hiltz, 1982; Phillips, 1982; Rice & Case, 1983; Steinfield, 1986; Rice & Love, 1987; Hiltz & Turoff, 1993). CMC appeared to be impersonal in some studies, but not always, which indicates CMC as a medium has no consistent effects as these early theories predicted. Examples of social interaction in CMC include friendship or romance in chat rooms, virtual communities, and emotional e-mail exchanges. Some scholars hypothesized that users adapt to new communications behavior over time and become accustomed to such interactions. A longitudinal study has found that the length of online partnerships (short-term vs. long-term) made a greater difference than that of face-to-face relationships, indicating, "CMC acts as a moderator by which participants may come to expect or not to expect ongoing interaction with their partners. This anticipation, in turn, shapes their future interpersonal interaction" (Walther, 1996, p. 12). Some scholars suggested: "communication through interactive electronic media creates a feeling of greater propinquity with others, regardless of their actual geographic dispersion. This electronic propinquity might be expected to foster friendships, as actual propinquity is known to do" (Walther, 1992, p. 75). Situational determination can

influence a choice of a particular medium at that particular moment (Trevino, Lengel & Daft, 1987). Situational determinants include distance, time pressure (Trevino, Lengel, & Daft, 1987), relationships among the communicators, topic of the communication, and social norms (Sproull & Kiesler, 1986).

Thus, it appears that communicators could sufficiently maintain existing relationships by partially replacing face-to-face or phone conversations with e-mail exchange once they have learned how to convey the equivalent social cues electronically. In other words, communicators may perceive that e-mail could compensate for the reduction of face-to-face or phone conversations and that this partial displacement may not hurt relationships in a long term.

To study social interaction, media bandwidth is an insufficient predictor of CMC effects. Viewing CMC from social, relational, and functional factors, not just the medium characteristics alone, would offer a better reflection of CMC (Walther, 1992). What a user expects from interactions with the others, for example, a long-term work relationship or friendship, determines the user's communication behavior (e.g., frequency and message content) on the medium. "The anticipation phenomenon is more likely to occur among people who see each others' faces and hear their voices...than among partners who never see or hear each other" (Walther, 1994, p. 479). Empirical evidence shows that people use CMC for forming and maintaining personal relationships. Particularly as people communicate via CMC over relatively long periods of time, they perceive CMC intimate enough to express personal disclosure (Walther, 1992; Walther & Burgoon, 1992). "The anticipation phenomenon is more likely to occur among people who see each others' faces and hear their voices...than among partners who never see or hear each other" (Walther, 1994, p. 479). However, there has not been an articulated theory about socioemotional interaction (e.g., getting to know each other, keeping in touch, and coordinating social activities) using CMC.

2.3.4 Text

Some scholars believe that CMC, which is to a great degree based on text, possibly degrade human relations. The Internet may be a means of bringing people

together, but it may reduce human contact (Minerd, 1999). People do not have face-to-face conversations as much as they used to partly due to communications technologies, such as answering machines and e-mail. People's voice conveys not only information but also feelings (Locke, 1998). Locke (1998) asserts that e-mail lacks information about who we are, how we feel, and what we are up to: It masks various social cues.

Indeed, writing eliminates the visual, nonverbal and vocal channels. However, a number of scholars argue that text messaging at times encourage communication (Hiltz & Turoff, 1978; Phillips, 1982; Myers, 1987; Rice & Love, 1987). There are a number of CMC applications including e-mail (which is most widely used by Internet users), chat rooms, BBS, e-messenger, and Multi-User Dungeons (MUDs), each of which is different from one another. But within CMC, e-mail is the closest to m-mail in terms of the level of personal-ness (i.e., direct, one-to-one private interaction) and the manner of operation. The others are generally for many-to-many, group communication. This subsection elaborates more about e-mail and its differences from m-mail.

E-mail is neither letter writing nor speech, but it can be formal like a letter and informal like a phone call (Misztal, 2000). E-mail is even comparable with an answering machine. "[W]hile e-mail is a written medium, it has more of the feel and style of oral communication" (Kolb, 1996, p. 15). People tend to communicate about a topic in several exchanges of shorter messages rather than in one exchange of long documents. Because of the peculiarity of this form of communication (i.e., it is neither writing nor speech), electronic exchange can provide both intimacy/informality and formality.

The informal side of e-mail characteristics is attributed to several factors. Its high level of interactivity and the transitory nature of language used are important factors. Misztal (2000) describes that "e-mail language is more dynamic, less carefully constructed and less inhibited" (p. 199) than letters. In e-mail, people can say things "'more freely' because of the ephemeral nature of this type of communication" (p. 200). E-mail can be also less confrontational than FtF and telephone interactions. Empirical research has found that e-mail users tend to feel less responsible for what they say

(Misztal, 2000). Further, an e-mail user can easily choose not to reply to the sender, while an immediate answer or reaction is expected in a FtF or phone conversation.

With m-mail, the user does not have to worry about writing rules--much more so than e-mail. A concise 'telegraphic' writing style would do (Kopomaa, 2000). "C U soon", "Good 4 U", and "How R U doing?" are English-language examples. M-mail messages are more for fun than for a serious purpose. People can send casual messages without any special reason for contacting. However, if the topic is something serious or emotional, one is likely to call or meet FtF to discuss the complex issue. Vocal cues, such as tone of voice, silence, and pauses, are difficult to send over a text-only medium particularly m-mail (because each m-mail message is very short). These characteristics of m-mail may cause miscommunication or misunderstanding between communicators.

Electronic paralanguage is a component of written language used outside of formal grammar and syntax and expressed in various visual and interpretive structures, providing additional, new, or redundant meaning to the message (Asteroff, 1987). People use paralanguage in alphabetic, symbolic, and spatial forms as a substitute for missing nonverbal cues in CMC to emphasize messages and to call for attention. SMS users in Scandinavia use the signs available on the mobile phone's keypad to make new combinations (Kopomaa, 2000). Smileys and other face symbols made with a combination of punctuation marks, characters, and a parenthesis are common paralanguage used by many. M-mail users, in general, in an effort to express as much as possible in a small number of characters, abbreviate words and use different grammar from their normal language. In addition, users create their own coded language with special meanings that can be understood only between the close friends. Secret language represents the same value and background of the communicators as well as intimacy and a warm, friendly relationship. All these add personal touch to m-mail messages.

Examples of smileys (Kopomaa, 2000, p. 71):

:-)	Smile
;-)	Wink
:-(	Sad
:-I	Serious
:-II	Angry
:'-(	Tearful
%-)	Perplexed
:-D	Laughing
.^V	Speaking
:-x	Sealed lips or a kiss

Kopomaa (2000) observes that young school children do not use e-mail much partly due to the increased popularity of SMS. He indicates that SMS serves the needs of the youth quite well. My observations of m-mail users suggest that the medium is more ritual, interactive, and private than e-mail for both Japanese and Swedish users. The reasons may include that:

- M-mail is mainly used for communication with close friends and family members.
- The language used in m-mail is shorter than the average e-mail message length.
- The handset is not shared usually, unlike home PC.

2.4 Interpersonal Relationships

Variability of SMS user behavior can be explained by a combination of a number of factors. Literature suggests that there are at least three broad areas to consider in m-mail research:

1) Attributes of the medium or perceptions of it including technological constraints
2) Cost
3) Interpersonal (including personality, emotional, and social) factors

As I described above, recent research on media selection and use suggests that, instead of media attributes (richness, cues, and channels), social, functional, and personal factors may be more critical for investigating user behavior in CMC. Situation and context change every time a message is exchanged. An individual's gratifications and perceived social norms are more stable cognitive and attitudinal variables, although they

change over time. Even personal traits, such as "willingness to communicate," are to some extent dependent on the situation (Daly, 1987). Communication psychologists seem to agree that interrelationships between situations and personality affect communication behavior. It must be noted that studies of personality in interpersonal communication have been done in FtF settings, so that some of them may be inapplicable to text-only communication. Cost is always a key factor for adoption and use of a technology. M-mail cost is cheaper than voice calls in general (Ito, 2001). Interpersonal factors seem to provide the greatest potential and these are also the most interesting areas to investigate. However, these are complicated and challenging areas as well. In this subsection I discuss theories and approaches in the field of interpersonal relationships, which might help explain the m-mail use phenomenon.

2.4.1 Social penetration theory

One of the most widely studied theories of relationship development is social penetration (Vanlear, 1991). Social penetration means "(1) overt interpersonal behaviors which take place in social interaction and (2) internal subjective processes which precede, accompany, and follow overt exchange" (Altman & Taylor, 1973, p. 5). Social penetration processes encompass a wide range of interpersonal events occurring in growing relationships, including verbal and nonverbal communication, environmentally oriented behaviors (e.g., physical distance and use of physical objects), and interpersonal perceptions and emotions. "[R]elationships involve different levels of intimacy or degree of social penetration and, equally important, all develop through time in a systematic and predictable fashion" (p. 3). Altman and Taylor (1973) have identified three major factors that may haste or restrain the growth of interpersonal relationships: personal characteristics of participants, outcomes of exchange (i.e., rewards and costs), and situational context.

Social bonds grow at varying rates and to various levels. Relationships do not progress in a linear, unidirectional path toward increasing openness and integration (Vanlear, 1991). Some social bonds may reach plateaus and then grow further; others may be returned to an earlier stage of intimacy or broken up (depenetration) (Altman

and Taylor, 1973). Partners go back and forth between sharing and distance. Vanlear's (1991) study shows the cyclical nature of relationship development involving periodic cycling between communicative openness and closedness, revelation and restraint. Thus, some researchers view communicative openness and self-disclosure as central to relationship formation and development. According to social penetration theory, people disclose more information as a relationship progresses to more intimate levels.

2.4.2 Self-disclosure

"Self-disclosure refers to the extent to which one confides personal information to others or verbally reveals oneself to other people....Personal information...includes personal attitudes, thoughts, tastes, interests, finances, and physical appearance" (Huang, 1999, p. 234). We constantly make decisions about self-disclosure--how much I should disclose my thoughts and feelings to another person. Self-disclosure is a necessary but not a sufficient condition to achieve intimacy. It is possible for an individual to know well about another person and still not like that person. Some people disclose their private information to strangers.

Self-disclosure of intimate information is based on mutual trust (Knapp, 1978). To disclose to another person, the communicator must trust the recipient. The recipient perceives that he/she has been trusted by the other person, which could lead to the recipient's own disclosure (i.e., "he trusts me, therefore I trust him"). An explanation of this disclosure reciprocity is that being trusted with another's disclosure is a social reward by the recipient (Derlega & Chaikin, 1975). Altman and Taylor (1973) suggest, "This 'trusting-being-trusted' network is probably one necessary condition for reciprocity of exchange" (p. 55). Research has found that people vary in the level of self-disclosure depending on the target persons (e.g., friends, parents, siblings, and strangers), the gender of the target, and the familiarity of the target (Huang, 1999). Self-disclosure may not be always healthy. Self-disclosure at times improves a relationship between two persons and makes them closer, and at other times,

particularly in an early stage of a relationship, intimate disclosure makes the other person withdraw or terminate the relationship (Derlega & Chaikin, 1975).

2.4.3 Preexisting personal network

New communication technologies, such as the mobile phone and the Internet, shift the balance between direct (FtF) and indirect (mediated) relationships (Calhoun, 1986; Ling, 2000). Social relationships in modern age are characterized by "the mediation of large-scale markets, administrative organizations, and/or information technology" (Calhoun, 1992, p. 208). Social life in today's world is organized more through mediated communication systems. Our time for social interaction is being put under pressure. These phenomena make us think whether it results in a new type of kinship and friendship or it isolates people who no longer interact face-to-face (Ling, 2000). If mediated communication changes social interaction, what would be the consequences?

When members of a communication network have prior ties, it is easier for them to initiate and maintain interaction on a new electronic communication medium (Kerr & Hiltz, 1982). In addition, the knowledge that one's peers are participating should increase system acceptance. However, the content of the communication in part depends on the emotional compatibility and trust between the communicators (Sproull & Kiesler, 1986).

While Baym (1998) says that there are no empirical grounds on which we can assess how or if online community affects offline community, Wellman (1997) suggests that analyzing social network might help understand how people are related to each other in cyberspace. Wellman's (1997) argument is that "People who use computer networks have social relationships with each other that are embedded in social networks. People's relationships with others strongly affect their social resources, mobility, happiness, work habits, and many other important things about them" (p. 181). With the mobile phone, the user can define his/her social network, which is limited to mobile phone friends who carry a mobile phone all the time. The text messaging capability contributes to the creation of this new form of relationship (Kopomaa, 2000).

2.4.4 Friendship

While kinship tells nothing of the actual content of the relationship between two related people, friendship "depends on the relationship created over time between the particular people involved...what brings people together in friendship may not be what keeps them together" (Bell & Coleman, 1999, p. 6). One of the features of contemporary middle-class culture is voluntary ties of friendship and lack of emphasis on kinship. Friendship is an important social institution in the loosely knitted modern society. Jensen (1990) argues that members of a society are operating separately and connected loosely. As discussed above, pre-modern life was based on FtF interactions among friends, and "modern life is characterized by distant, impersonal contact among strangers" (p. 71).

How electronic communication might impact on friendship is of interest for many. Chesebro (1985), believing that an "intimate" computer network is able to link people interpersonally, argues, "Rather than separating people from others, computers may function as an outreach system in which new types of friendships are created and sustained through an electronic connection" (p. 221). Some CMC researchers (Hiltz & Turoff, 1978; Kleiner, 1980; Kerr & Hiltz, 1982) claim that friendship could last longer with electronic communication systems "because it is simpler and less expensive to keep in touch with people at distance" (Kerr & Hiltz, 1982, p. 110). The ability to keep in touch with others is one of the major strengths of CMC. At different stages of the relationship, media can play different roles (Ling, 2000).

It must be noted that identifying and labeling the feeling of intimacy is subjective and relative, and therefore is subject to variation (Knapp, 1978). There may be some tendency by group of people. For example, men and women have different ways of assessing intimacy, while both may place the same value on intimacy (Swain, 1989).

Ling's (2000) study of Norwegian teenagers shows that they often make the initial contact face-to-face at parties and other social interactions and exchange mobile phone numbers. A few days later, one of the partners sends a SMS message to the

other. This strategy gives both parties control over the situation and gives them the time to think (Ling & Yttri, 2002). If the other responds positively, they possibly move into more synchronous modes of communication, such as telephone conversations and FtF meetings. As the relationship develops, secret, private communication controlled by the partners themselves become crucial (Misztal, 2000). Intimates often develop an interpersonal jargon with private symbols and meanings. They may also use certain words and phrases commonly used by others but have special meaning for them (Knapp, 1978).

2.4.5 Family communication

Theories of family communication emphasize either intersubjectivity (shared perceptions and definitions) or mutual influence processes (Meadowcroft & Fitzpatrick, 1988). Each theoretical perspective makes an assumption about which aspects of family life are important to examine to assess its impact. Among these approaches, interactionism has the widest application. The family is a unit of interacting personalities. The assumption of this perspective is that "individuals come to define themselves and the world around them through interactions with other people" (p. 261). Because definitions of family are changing, communication between traditional and contemporary family structures is likely to vary. Changes in family structures and communication patterns affect society as a whole.

2.4.6 Social influence

The social influence model of technology use says, "individuals' media perceptions and use are, in part, socially constructed" (Schmitz & Fulk, 1991, p. 490). "Social influence is a process that involves complex cognitive processing of multiple direct and indirect information cues embedded in the individual's social world" (p. 493). The model proposes that a) people around the user influence the user's subjective perception of richness of the medium as well as uses of the medium and that b) the user's skills and experience of the new communication technology facilitate use of that medium. The survey data of Schmitz and Fulk (1991) indicate that if co-workers

heavily use e-mail, an individual may perceive that it is a rich medium. Co-worker use of e-mail indirectly influences the individual's e-mail use and perception of usefulness of the medium.

The role of the peer group is critical in the spread of the mobile phone and m-mail as well, particularly for children and adolescents. During adolescence, friends are most central to the individual and interactions with peers take the significant portion of the teen's time and energy (Ling & Yttri, 2002).

Another social aspect of electronic messaging involves how communication technologies have been collectively integrated in people's everyday life. Flanagin and Metzer (2001) describe:

> in a relatively short period computer-based technologies have evolved from being viewed as largely unrelated to other media in terms of their need fulfillment...to fundamentally interwoven with them. People seem to be integrating computer communication into their daily repertoire of communication tools and using computer-based technologies to fulfill a variety of needs just as they use more traditional media. The functional image of email, for example, is now becoming like that of the telephone, a good way keep in contact with friends and family. (p. 171)

Viewing CMC from the diffusion perspective, it is clear that "early adopters are influenced by later ones or nonadopters as well as vice versa" (Markus, 1987, p. 494). Early users of an interactive medium, such as e-mail and m-mail, "experience low benefits and high costs relative to those potentially obtainable" (p. 494). If others follow early users relatively quickly and adopt the medium, "benefits to the early users will increase and costs decline. This will attract additional users, creating a rapid acceleration of use" (p. 495). Such reciprocal behavior gets started when critical mass is reached and begins collective group action. The interactive nature of CMC would make reaching critical mass a more determinate factor than non-interactive technologies.

2.4.7 Computer literacy and writing skills

People who cannot read and write well, or who believe they cannot, may become handicapped in the digital society. Technological difficulties may affect the

emotional domain (Phillips, 1983). "Each technical component may be part of a larger context or may trigger certain social psychological processes" (Kiesler, Siegel, & McGuire, 1984, p. 1124). Different people have different levels of comfort associated with acquiring computer skills.

Some studies "indicate that high-levels of literacy are not necessary in order to use and benefit from" (Kerr & Hiltz, 1982, p. 74) computer-based communication systems. An experimental study by Korzenny and Bauer (1981) has found that communication skills do not have an impact on psychological distance, nor communication satisfaction, during electronic exchange. Other researchers have argued that those who are more literate in the written mode are more satisfied and confident in CMC (Phillips, 1983; Chesebro, 1985). For example, when people try to convey emotional content in text, it does not always flow naturally and can be misunderstood by the other party.

Some also suggest that computer and keyboard skills may affect individual's choice of CMC media (Phillips, 1983; Schmitz & Fulk, 1991). Typing skills have been studied in relation to amount of use and satisfaction (Kerr & Hiltz, 1982). Findings are mixed. It appears that CMC users soon learn skills such as typing, spelling, and writing: Their skills improve with use of the system (Kerr & Hiltz, 1982). An e-mail study by Rice and Case (1983) also indicates that some people can become "experienced" users in a short period of time. Over time, their perceptions and styles of the written communication change. Further, as users gain more experience with the medium, they tend to find functions that are helpful and valuable to them (Hiltz & Turoff, 1981).

Greenwald (1990) points out that a human factor prevented videotex use in the consumer market from growing. Consumers of communication technology sometimes have "fear of the technology combined with a reluctance to alter some living patterns" (p. 167). She continues to argue that, in the case of videotex, the product intimidated consumers and the services of videotex did not offset the fears. Some consumers' fear of new technology as well as tendency to maintain the status quo in their use of communication technology may be also the case in m-mail.

2.4.8 Personality factors

Kerr and Hiltz (1982) consider personality factors as critical variables that may affect an individual's system acceptance:

> There has been little research on the relationship between personality factors and acceptance of computer-based communication systems. There is reason to believe, however, on the basis of qualitative observations and impressions, that basic personality characteristics and values do have predictive power....Individuals who are assertive, have high internal control, and high tolerance for ambiguity probably will accept and use computerized communication systems more than those with the opposite traits. (p. 71)

Schmitz and Fulk (1991) question whether written media might be perceived as rich for an individual who tends to get conscious (having communication apprehension) in FtF situations. Communication apprehension (CA) refers to fear or anxiety associated with ongoing or anticipated communication with another person(s). CA is developed through experience--a lack of confidence derived from the difference between expectations and outcomes. An individual's level of CA is one of the best predictors of the person's willingness to communicate (McCroskey & Richmond, 1987). It is also linked to perceived communication competence. CA can be either trait-like or context-based. In a given type of context, a person who usually has a high level of CA might feel less CA. A person with high CA may not speak in FtF interactions or over the phone, but may express himself/herself more freely while exchanging text messages with his/her close friends and family members.

Huang (1999) suggests that shyness and sociability are two of the most commonly used variables to judge people's personalities. Shyness is "a tendency to feel discomfort, tension, or awkwardness in reaction to being with strangers or casual acquaintances" (p. 234), while sociability refers to as "a tendency to affiliate with others and to prefer being with others" (p. 234) to be alone. Sociable people are expressive, cheerful, and friendly, while shy people are quiet, reserved, and reflective. These differences are similar to those of extroverts and introverts.

Loneliness is another trait often associated with communications. Loneliness is a ubiquitous feature of modern life. Research has found that short-term loneliness

motivates social activity and productivity, while chronic loneliness is linked to social apathy (Bell, 1985; Perse & Rubin, 1990). Loneliness correlates positively with shyness and communicative anxiety, and negatively with self-disclosure, responsiveness, meaningfulness of interaction, and frequency of interaction. The studies of Sloan and Solano (1984) and Bell (1985) indicate that loneliness is related to low levels of talkativeness, participation, and attentiveness. Thus, lonely people communicate less skillfully than nonlonely people do, which may inhibit the development of new and existing relationships. Sloan and Solano (1984), however, found no significant differences on self-disclosure in same-sex relationships between lonely and nonlonely people.

2.4.9 Belonging

All communication activities probably are motivated by affiliation with other people. But it seems to me that this drive to interact with another is particularly strong in the case of m-mail. Baumeister and Leary (1995) propose a hypothesis that a need to belong is a fundamental human motivation. The belonging hypothesis consists of two main features. One is that human beings have the need for frequent interactions, free from conflict and negative effect, with a few other people. The other is that these interactions must take place in the context of a stable and enduring teamwork with affective concern for each other. Ideally, this concern would be mutual so that these partners have reciprocal feelings.

People fundamentally need relationships characterized by both regular contact and an ongoing bond. Baumeister and Leary (1995) believe that this is a universal need found in all human beings. A higher level of belonging-ness is related to positive emotions and effects, such as approval and intimacy. Approval and intimacy are required for forming and maintaining close relationships. The formation of social bonds is related to positive emotions. "[S]ocial rituals involving greetings and farewells serve to assure others of the continuation of one's relationship with them" (p. 503). Kopomaa (2000) observes that young SMS users have found a solution in the medium:

it allows them to belong to a group. They have internalized a new kind of communality through the use of SMS better than the older generations.

CHAPTER 3: METHOD

3.1 Preliminary Data Collection

This study uses part of the results of a pilot investigation to inform the design of the data collection instruments. I conducted interview research in summer 2001 in Tokyo and Stockholm. The purpose of the research was to investigate how and why people in these two cities use m-mail to communicate with friends and family, focusing on identifying users' motives for using m-mail and usage patterns. All the interviews were face-to-face meetings. I met 17 users (8 males and 9 females) in Tokyo between 12 June and 18 June 2001 and 19 (8 males and 11 females) in Stockholm during the periods 28-30 August and 6-10 September 2001. The subjects' age ranged from 16 to 50+ in both countries. I used an interview guide with mainly open-ended questions (Appendix B). Although the core questions were developed prior to the interviews, these questions were reworded and explanations of questions were provided whenever a respondent asked for clarification. Also, during the preliminary fieldwork, I simply observed, in a non-intrusive manner, users' verbal and non-verbal behavior while they were on the mobile phone in public locations.

In general, I found more similarities than differences between the Japanese and Swedish respondents during the preliminary investigation. The goal of the pilot study was to understand many aspects of m-mail use. This study focuses on part of the scope of the pilot study and further examines the focal point—text messaging users and their relationships. In this section, therefore, I only include findings of the pilot study that are directly related to relationship maintenance. For user motives, views of m-mail, perceived advantages and disadvantages, and usage patterns, see summary of pilot study findings (Appendix C).

Most respondents in both countries said that there was no change in the time they spend with their family members for face-to-face conversations and the frequency of such conversations since they bought mobile phones. Two (one Japanese and one

Swede) said it increased. A few Swedish respondents said there was a change but it was not because of the use of the mobile phone.

Surprisingly, most respondents said that the time and frequency of face-to-face meetings with their friends did not change, either. They said they would still meet with their friends if they did not have mobile phones. A few said, however, that they met their friends more often because it was easier to set up meetings using the mobile phone (either m-mail or calling). Two Japanese said that they met less frequently with not-so-close friends because in their busy lifestyle they could maintain the relationships via m-mail and put off face-to-face meetings with certain people.

Most respondents felt that m-mail did not have much impact on their relationships with family mostly because their m-mail use to communicate with family was none or very little. Most Japanese respondents lived with their families, and many of them felt it was not necessary to communicate with their family members during the day. Ten of the 19 Swedish respondents lived alone. But whether they lived alone or with their parents, children, spouses, or siblings, m-mail was not their main communication method for communicating family. The only exception for this usage pattern seemed to be young, unmarried couples (significant others). If the respondents were communicating with their family members via m-mail more often, their answers might have been different.

In terms of a possible impact of m-mail on the respondents' relationships with their friends, opinions varied. Some said it had no impact, while some said it deepened their relationships with friends. Seven Swedish and 11 Japanese respondents indicated "positive" or "improved" changes. Some of the respondents who felt "no impact" of m-mail at the same time admitted that m-mail helped them to meet their friends more frequently because m-mail makes it easier to arrange meetings or get together with a short notice. M-mail provides direct, one-to-one communication independent of time and location. Some people express more freely in writing than in speech. In that sense, sometimes m-mail makes the user understand their friends better. Also, people reply to m-mails but not so often to phone messages. A few Japanese respondents said that because of m-mail interactions they felt they were connected with their friends even

when they did not talk on the phone. Swedish users were a little less optimistic. Some Swedish respondents said that m-mail communication, even if it were frequent, would not deepen friendship.

Some of these pilot study findings were incorporated into the measuring instruments of the present study, as discussed below.

3.2 Method Selection

Experimental methods would not yield any meaningful outcomes, as individuals' m-mail use behavior is not formed in a few hours, particularly in a laboratory setting. Rather, users develop their communication behavior over a long period of time. Because it is difficult to see what is sent or received on a small mobile phone screen and my presence would likely influence the content and frequency of m-mail messages, ethnographical observation would not be appropriate. I used face-to-face interviews in summer 2001 to obtain preliminary general data about m-mail use. For this study, I used a combination of survey and Q-methodology as the data collection method.

Survey research

Survey is one of the most popular methods in communications research. There are several types of surveys: mail, telephone, personal interview, and group administration. It takes several weeks to complete a mail survey and the response rate of a mail survey is usually low. Telephone surveys must be simple and short and cannot use questions with long lists of response options. I used an administered survey with mostly closed-ended questions to mainly ask respondents their m-mail usage patterns (Appendix D).

An administered survey can clarify unclear terms while respondents are filling the survey, although this type of survey requires the researcher's physical attendance. The researcher could ask complex questions, compared with a self-administered or mail questionnaire, as he/she is present to administer during the survey. This method is less time-consuming than interviews. The absence of audio-taping provides greater

anonymity for the respondent. Interviewer bias is smaller in a survey than in interview research. Also, the cost of survey studies is usually less than that of interviews.

Surveys, however, are not as flexible as personal interviews. The researcher cannot prove answers beyond the given answer, nor can clarify ambiguous answers. Question wording and sequence of questions may influence respondents' answers. A response set, the tendency to answer all questions in one direction regardless of the content, may arise. Respondents may feel uncomfortable with revealing their personal experiences, views, and opinions, even when anonymity and confidentiality are guaranteed.

Q-methodology

Q-methodology is used for qualitative analysis but employs factor analysis. Statistical procedures aid the researcher to examine subjective opinions, attitudes, and behaviors and allocate them into categories (types). This method does not require a large sample, which helps this study. And yet the method is useful for analyzing complex problems involving a wide range of variables. For the present study, Q-methodology systematically identifies respondents' types. A type in this study is a composite of attitudes and behavior concerning general social interactions and specifically m-mail use. Characteristics of each type are then linked to quantitative data such as the demographics and m-mail usage patterns taken from the survey. As with other qualitative research methods, Q-methodology is not suited for determining causality. Generalization is difficult with this method. This method, however, can add rich information about respondents beyond demographic variations. Respondents' feelings, opinions, and preferences in the area of interpersonal communication and attitudes toward m-mail provide another layer of information that helps to better understand the m-mail phenomenon.

Introduced by William Stephenson, a psychologist/physicist, Q-methodology has been applied to systematically analyze people's subjective tastes, feelings, and opinions, and any other areas where subjectivity or qualitative aspects of human

behavior are involved (Brown, 1991, 1999; Brouwer, 1999). To use this method, a researcher first constructs a collection of subjective surroundings on a topic, called a concourse, which may include verbal, visual and sound expressions. The items in a concourse typically are taken from what people have said in preliminary interviews, participant observation, and literature. From the concourse, the researcher draws a sample of items, Q-sample. The number of respondents is normally much smaller than the number of items in the Q-sample (Brouwer, 1999). A sample size rarely exceeds 50 even in a public opinion study (Brown, 1991). Each respondent is then asked to rank (referred to as Q sorting) the Q-sample items on a scale ranging from "strongly agree" to "strongly disagree" from his/her point of view. There is no right or wrong way to answer the person's own point of view. In other words, there is no external criterion to compare his/her answers. The Q-sort results are correlated for factor analysis.

An example of the studies Q-methodology has been applied is a public opinion survey Peritore and Peritore (1990) conducted in Brazil in 1987 to identify the dominant opinion types on the agrarian reform issue. They used 41 statements as a Q-sample. Examples of their Q-statements included, "The Church should stimulate Ecclesiastical Base Communities, unions, and commissions; that is, promote a movement in the countryside" (p, 382) and "We should not worry about the concentration of landholdings, because there is much open land to be incorporated by the expansion of the agrarian frontier" (p. 383). With 46 participants purposively chosen, six types (Church Radicals, Secular Radicals, Agrarian Populists, Critical Reformers, Legalists, and Capitalist Modernizers) were resulted. Since the aim of their study was to uncover and model attitudes, a large person sample was not necessary.

Another example of Q-methodology-based research is a media use study by Donohew, Palmgreen, and Rayburn (1987). They initially conducted a mail survey and chose 114 (the upper limits of the processing capability of the Q factor analysis program) out of the total respondents. Their investigation focused on social and psychological origins of media use. They identified four types of people on a broad range of variables including lifestyle and media use patterns: disengaged homemaker, outgoing activist, restrained activist, and working class climber. Thus, they were able

to include numerous, intertwined social, psychological, economic, and political factors in their instrument and demonstrate "rich multivariate insights into the nature and origins of mass media use and consumption" (p. 274).

See Appendix E for the Q-sort procedure used for this study and the statements being sorted by each respondent.

Triangulation

No method is perfect, but the multimethod approach allows the researcher to gain strengths of individual methods and to compensate for their limitations (Brewer & Hunter, 1989). Examining a single topic from multiple perspectives help build confidence in the findings. I designed the research process in iterative steps. I collected preliminary qualitative and quantitative data through interview research in summer 2001, which provided me with a good idea as to what kinds of answers should be expected given certain questions. This step helped me to narrow down my interests into a manageable set of research questions. I developed a survey and Q-sample, using the respondents' answers and the trends found in my pilot interviews. More specifically, the questions, response options, and Q-statements are in most part based on what my respondents said during the interviews. The survey and Q-methodology add more focused and rich data toward the goal of this study.

3.3 Sampling Method and Expected Samples

Random sampling of m-mail users is not attainable, as a mobile phone service subscriber list is unavailable. Besides, not all mobile subscribers use m-mail. The only way to identify m-mail users is to look for people who are moving the thumb on their mobile phones in public locations or simply ask people if they use it. It is relatively easy to spot such users in public locations, where people check mails, headline news, and so on while they are on the move or waiting for someone.

Potential respondents were recruited in Tokyo, Japan and Stockholm, Sweden using purposive and snowball sampling. My informants in these cities contacted their friends, students, and acquaintances first according to the selection criteria below.

Those informants coordinated with me to select several respondents each and set up times and dates of the survey/Q-sort sessions. The first set of respondents were asked at the end of their sessions whether they knew anyone who might be willing to participate in my study. The process was repeated until sufficient data were collected. The combination of purposive and snowball sampling methods was expected to yield a research sample large and diverse enough to meet the objectives of this study. The minimum number of respondents was targeted at 30 in each city. Recruiting guidelines included varying demographics (e.g., age and occupation), both males and females. Age ranges from 16 to 50+. Children age 15 or younger were not to be included in the sample since they might not be able to understand some of the questions or articulate their thoughts. The minimum criteria for sample selection were the following:

- The person sends or receives at least one m-mail message a week.
- The person lives, works, or attends school in Tokyo (Japanese respondents) and Stockholm (Swedish respondents).
- The person is 16 years old or older.
- An in-country sample has variations in age and occupation.
- The male-female ratio should be approximately one; male 50% and female 50%.

Since high school and college students are part of my sample, I must note here some key differences in the school system between Japan and Sweden. The Japanese school system consists of six years of elementary school, three years of junior high school, and three years of high school. Public elementary and junior high schools are free of charge, except for supplies, transportation, and school lunches. Almost all students finish at least high school. Students who graduate from high school may go on to four years of university/college, two years of junior college, or vocational schools (Hawaii State Dept of Education, 2002). Children in Sweden go through compulsory education for nine years. The normal age to start compulsory school is seven, but children have a right to start at age six, if their parents desire them to do so. Almost all students graduating from compulsory school continue studying in upper secondary school for three years. Upper secondary school is also free of charge. Undergraduate university/college education comprises of general and professional degrees. The

general degree includes diploma (2 years of study), bachelor's degree (3 years), and master's degree (4 years). Professional degree programs are designed for specific professions (ESTIA, 2002). The academic year in Sweden begins at the end of August and ends early June in the following year, while the Japanese academic year is from the first week of April to early March.

3.4 Key measures

Survey

The questionnaire (Appendix D) mainly measured respondents' usage patterns of m-mail vis-à-vis FtF and telephone interactions. All questions are closed-ended. Respondents were asked to choose their responses out of the response options or write in length of use and frequency of interactions. The questions were categorized into several key measurements:

a) Consumption of interpersonal communication media

1) The length of mobile phone ownership, pager ownership, m-mail use, and Internet use

2) Frequency of m-mail, telephone, and e-mail exchanges

3) Usage (frequency and duration) changes over time--displacement phenomena

b) Personal social network

1) Relationships with the people respondents communicate with

2) Geographical proximity between respondents and their friends and family members

3) Possible impact of m-mail on actual relationships

c) M-mail as a communication tool

1) Perceptions of the medium and immediacy

2) Dependency

3) Gratification (enjoyment)

4) Modality; comparison with FtF and the telephone

5) Private vs. shared use of the mobile phone and m-mail

d) Content of m-mail

1) Language used in m-mail vs. e-mail and FtF

1) Language with special meanings among a small group

e) Demographic data

1) Gender

2) Age

3) Occupation

Q-Methodology

Q-methodology, through Q-sorts, identifies types of communication behavior, particularly related to m-mail use, and attitudes toward interpersonal communication in general. The Q-sort process is similar to the Likert scale. Respondents are to decide how much they agree or disagree with each statement and choose a point on a 9-point scale ranging from "strongly disagree" to "strongly agree." Based on my pilot interviews and literature review, I selected 43 statements as a Q-sample for this study. These Q-statements are concerning social network and socializing activity (10 statements), intimate content (7), interactivity (2), privacy (4), addiction and dependency (3), modality (7), language (3), and technology (7). See Appendix E for Q-statements.

3.5 Details of the Actual Procedures of the Survey and Q-sorting

3.5.1 Translation

A questionnaire (Appendix D) and Q-statements (Appendix E) were constructed in February 2002. The original instruments were developed in English. The decentering method (Marine & Marine, 1991) was used to generate their Japanese equivalents and refine the original English-language versions in March 2002. A bilingual graduate student, who was studying American literature at a college in California, first translated the English language version into a Japanese language version. Another bilingual graduate student in the University of Washington Public Affairs Department took the Japanese version and translated it back into English. I compared my Japanese translation and the original English version with their

translations. Both the Japanese and English versions were modified as appropriate. In addition, I had my Japanese friend, who is also bilingual, review both the Japanese- and English-versions of instruments for critique. Input from the reviewers was integrated into a final version of the instruments (Appendices C and D).

The English versions of the instruments were used in Stockholm. People in Sweden are proficient in English. In Tokyo, I used the Japanese language instruments and gave instructions to respondents in Japanese.

Human Subjects Division approved my proposal including the procedures and instruments at the end of April 2002.

3.5.2 Recruiting respondents

While the translation was in progress, I began sending e-mail messages to my contacts in Stockholm and Tokyo asking them to recruit potential respondents for my upcoming field trips. Most responses I received were positive and before I left Seattle for Stockholm, my first fieldwork site, in the middle of May I was assured that I should be able to obtain about 30 respondents in each city. Professor Leonard Barchak of NcNeese State University, who studied with the Q-methodology founder William Stephenson and has worked with this method extensively, advised me that in order to obtain significant results I would need at least 30 subjects in each data set. The number of respondents, however, exceeded my initial goal. My contacts in both cities were extremely helpful and the subsequent recruitment through some of the respondents was also successful. Forty people in Stockholm and 56 in Tokyo participated in my study. Characteristics of these 96 respondents are discussed in detail in the next chapter. The period of my fieldwork in Stockholm was from May 14 to May 23, 2002, and I stayed in Tokyo only for a week starting on May 30, 2002.

3.5.3 Pretest

The pretest would not only reveal deficiencies of the measuring instruments, including wording and translation, but also provide some idea as to how much time it would take to complete a whole session.

The pretests of my measuring instruments could not be done before I left for those field sites. The questionnaire would have been rather straightforward. However, the Q-sort instructions looked complicated when they were written. I tried to ask a few people, but printing and cutting Word files, as e-mail attachments, to have anyone make 43 Q-statement cards and nine number cards seemed too much to ask. One of my cultural informants in Stockholm gave me some suggestions, and a few words and typographical mistakes were corrected. The first meeting in each city was the pretest. The first groups that went through the pretest procedures happened to be high school students in both cities--five high school students in Stockholm and six in Tokyo. I asked them a few times while they were filling out the questionnaire and sorting the Q-statements if there were any words, phrases or sentences that were unclear to them. Nobody asked for clarification or made suggestions on the instruments. Everybody in these high-school groups said there were no problems. Since I was present at all the subsequent meetings, with the exception of ten respondents in Tokyo my contact administered, I was able to answer respondents' questions as they went through the procedures. Some respondents asked me the meaning of some of the questions, words, and statements. In Sweden, a few respondents said before they began the questionnaire that their English was not so good as others, but all completed both the survey and Q-sorting without problems or delays. Thus, I encountered no major problems concerning the instruments in either city.

3.5.4 Fieldwork

Once a potential respondent agreed to participate in my study, a specific date and time as well as a location to meet were set. One to ten people went through the survey and Q-sort at the same time and location. All sessions were made on a face-to-face basis. I administered all sessions except for a group of ten employees of a company in Tokyo, where one of my contacts administered both the survey and Q-sorting for me. Before a session began, I explained the respondents the purpose of the study and had them read the cover page of the questionnaire, which included consent information. Respondents were encouraged to ask any questions before and during the survey. After

filling out a questionnaire, respondents were asked to sort Q-statements, which provided qualitative information about their attitudes and opinions concerning interpersonal communication. It took 40 to 45 minutes to complete each session including the survey, Q-sorts, and instruction time. Typically, respondents spent 20 minutes for the survey and 20 minutes for Q-sorts. At the end of the session, I gave each respondent a small gift.

Some of the meetings were group-based--two to ten people per group--and some meetings were done on a one-on-one basis. It was not difficult to meet with multiple students simultaneously at the same location, but I had to accommodate schedules of those who were employed full-time. Meetings with respondents took place at school cafeterias, classrooms, coffee houses, restaurants, and workplaces. Many adult respondents gave me their work phone numbers and mobile phone numbers voluntarily so that we could set meeting times and locations easily without going through my original contacts. Some respondents expressed their interest in the topic of my study and Q-methodology. Many were familiar with survey research but not with Q-methodology and found the latter interesting. All data collection was completed in the first week of June 2002.

3.5.5 Coding and data entry

After returning from Tokyo in early June, I coded survey responses according to the codebook (Appendix F) and entered numerical values in SPSS. All questions in the questionnaire are closed-ended, so that the coding scheme is simply to use numerical values assigned to the response options. I then entered the Q-sort data in PQMethod. PQMethod is a DOS-based software program and entering data was somewhat cumbersome, as I am accustomed to use Windows-based software programs. The statistical procedure employed in PQMethod is Q factor analysis. The purpose of Q-methodology is to understand the respondents' types. The key is to ensure that grouping of the data is appropriate and meaningful. The types identified in Q factor analysis were correlated with their answers to the survey. The PQMethod Manual written by Peter Schmolck (2000) was my main source of information about the program. I also looked

at some of the Q-methodology-based studies, such as Brown (1980) and Barchak (1977), as well as a few statistics books (Tabachnick & Fidell, 1983; Stevens, 1996) to know more about factor analysis.

3.5.6 Interpretation

Although Q factor analysis is used, this is basically qualitative research. Explanations emerge from the data (i.e., what opinions and feelings the respondents reported) rather than from the statistical results. Wherever appropriate, I incorporate transcripts of my 2001 interviews into my interpretation. There are three major areas of interpretation: use of m-mail in Japan, use of m-mail in Sweden, and differences and similarities between the two. Results are examined to answer to the research questions. Discussions on findings follow.

CHAPTER 4: FINDINGS

4.1 Characteristics of the Sample by Type

4.1.1 Types for the Swedish, Japanese, and Combined Samples

Q-sorting results are presented here first, as the respondents' types make a difference when my Research Questions are answered. Individuals have different attitudes and behaviors toward communication, communication tools, and social interactions with other people. Having respondents express how they feel and how they would behave in certain situations through the Q-sorting process may identify some common and differentiating patterns. By grouping people with similar attitudes and behaviors together and comparing the characteristics of these groups, my research questions could have in-depth answers.

Using Q-sorting results, I have identified four types of respondents in each city and five types in the combined sample. As mentioned in the previous chapter, the total number of respondents was 96, 40 in Stockholm and 56 in Tokyo. Four Swedish types are labeled Practical Users, Young Social Networkers, Veteran E-mail Users, and Heavy Female Users. The four types of the Japanese sample are named Non-believers, Emotional Users, Student-like Heavy Users, and Reserved Writers. Five types of the combined sample are called The Realistic Majority, Heavy Voice & Data Users, Reluctant Users, Text-Messaging Lovers, and Confident Infrequent Users. Differences and similarities of these types are discussed in the subsequent sections after introducing factor analysis.

As discussed in the Method section, Q-methodology has been used to measure subjectivity. The Q-sorting process is having respondents determine how much they agree or disagree with Q-statements and place each statement card at the right position on a scale. In my study, I used 43 statements and a 9-point scale, from -4 to 4 (See details in Appendix E). Factor analysis is employed in Q-methodology. Factor analysis of Q-sorting, unlike factor analysis in survey research, clusters together the individual respondents, and not variables (i.e., statements) in their answers.

In this study, I used three data sets, one for the Stockholm respondents only, one for the Tokyo respondents only, and one for both cities' respondents. I used the same data analysis process for these three.

The PQMethod software program extracts row data by either centroid analysis or principal components analysis. These methods produce unrotated factor matrices. With centroid analysis, the program can extract up to seven factors, and principal components analysis always computes eight factors in PQMethod. As the rotation methods, the program allows varimax, manual rotation, or a combination of these. PQMethod is mathematically based on Brown's (1980) work, including the selection of extraction and rotation methods, computation of factor loadings and factor scores. The software program generates a standard set of reports after the researcher specifies the number of factors to rotate and flags cases within each factor.

The key to factor analysis seems to be two-fold. One is to figure out how many factors (i.e., people's types) should be kept and the other is to identify which case (i.e., respondent) belongs to which type. Some respondents may not belong to any types if they have low factor loadings or their factor loadings values in two or more types are close to each other.

Two tests are widely known for determining the appropriate number of types in a factor-analytic study: Kaiser's eigenvalue test and a graphical scree test. The eigenvalues of the three data sets at the 8^{th} factor is larger than 1.00. Therefore, I could have eight types extracted and rotated, if I used the criterion of eigenvalues >1. However, dividing 40, 56, or even 96 people into eight groups (maximum number of factors specified in the program) does not seem to be conceptually sound because some groups would consist of only one or two people. In a scree test, the magnitude of the eigenvalues (on the vertical axis) is plotted against component numbers. The eigenvalues decrease sharply at the beginning and then from a certain point slowly. It is recommended to retain the number just before the line levels off. The scree tests (Figures 4.1, 4.2, and 4.3) indicate four or five types would be good for each data set.

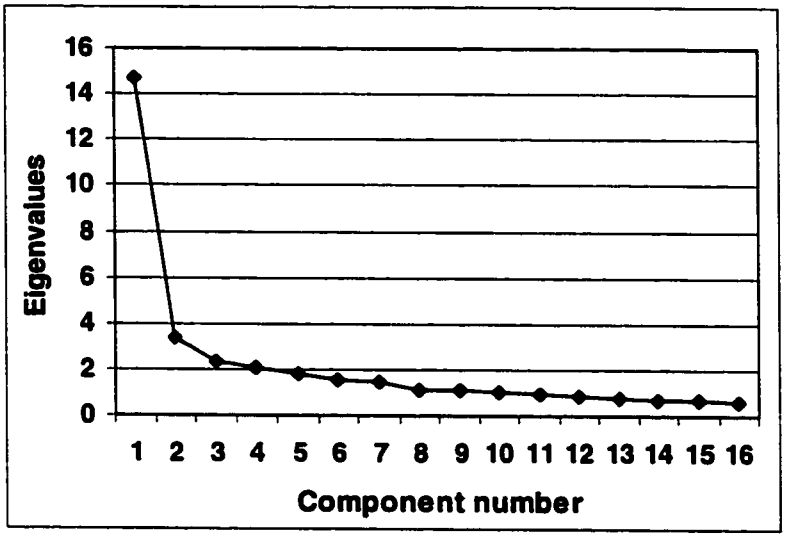


Figure 4.1: Scree Test for the Swedish Sample

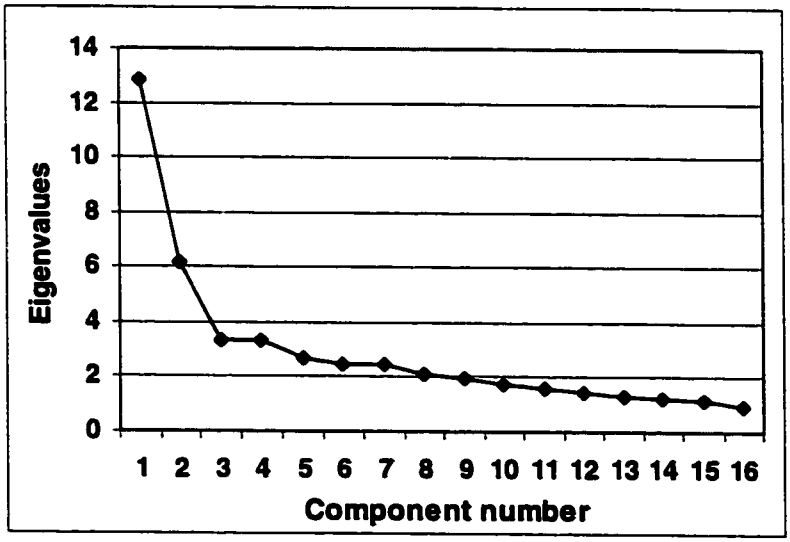


Figure 4.2: Scree Test for the Japanese Sample

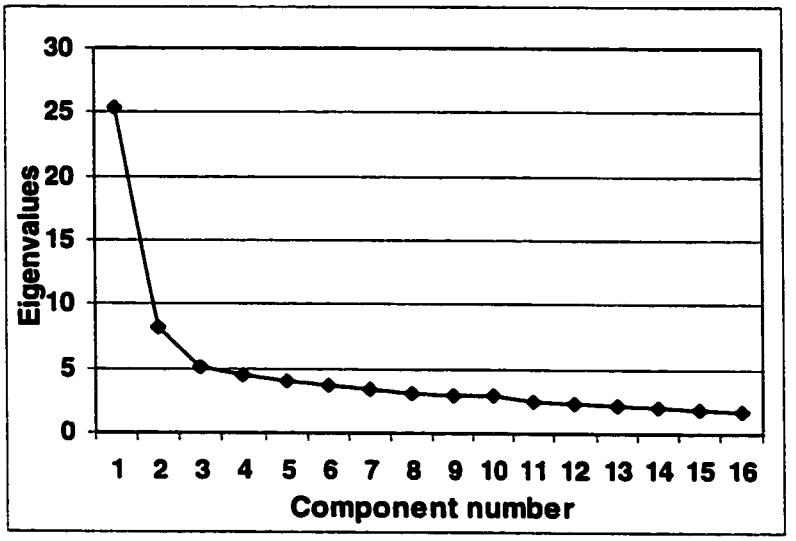


Figure 4.3: Scree Test for the Combined Sample

After trying all extraction and rotation methods, I have found the best results are produced using the combination of principal components analysis and varimax rotation. Varimax rotation maximizes the variance of the loadings across cases within factors, so that it is easier to interpret the resulting factors. Brown (1980) says that the rotation of factors involves artful judgment and that, even so, varimax provides an acceptable factor structure for Q-methodology.

As stated above, I identified four types for the Swedish sample, four for the Japanese sample, and five for the combined sample. To be consistent across those data sets, I applied the same extraction and rotation methods to all data sets. To select respondents for each type, I used the system-generated flagging feature. The PQMethod program flags factor loadings only when they are significant at $p<.05$. The program also calculates composite reliability of each type using Brown's (1980) formula. Composite reliability is basically a function of the number of defining variables (i.e., subjects). The higher a type's reliability, the lower the magnitude of error associated with the type's scores. The combination of principal component analysis, varimax, and the number of types selected, I have obtained factor loading

results that include as many subjects as possible in types and at the same time keep correlations among the types relatively low.

Appendix G shows Q factor analysis data including factor loading values, respondent IDs, and correlations between types. The following is a summary of the types of respondents identified through the Q factor analysis:

1) Swedish sample

Type	Number (%) of respondents
Practical Users:	11 (27.5% of Swedish sample)
Young Social Networkers:	9 (22.5%)
Veteran E-mail Users:	8 (20.0%)
Heavy Female Users:	4 (10.0%)

Out of 40 Swedish respondents, 32 (80.0%) are accounted for.

2) Japanese sample

Type	Number (%) of respondents
Non-believers of M-mail:	18 (32.1% of Japanese sample)
Emotional Users:	13 (23.2%)
Student-like, Heavy Users:	8 (14.3%)
Reserved Writers:	7 (12.5%)

Out of 56 Japanese respondents, 46 (82.1%) are accounted for.

3) Combined sample

Type	Number (%) of respondents
The Realistic Majority:	19 (19.8% of total sample)
Heavy Voice & Data Users:	19 (19.8%)
Reluctant Users:	16 (16.7%)
Text-Messaging Lovers:	10 (10.4%)
Confident, Infrequent Users:	3 (3.1%)

Out of all (96) respondents, 67 (69.8%) are accounted for.

4.1.2 Q-Statements

Since the foundation of the grouping in Q-methodology is which statements the respondents thought are agreeable, true, and important and which are not, understanding the patterns of the levels of agreement with certain statements for each type is critical. As shown in Appendix E, I used the following 43 statements as the Q-sample for this study. These statements have been taken from what my interviewees said during my 2001 interview research as well as from literature. It must be noted that I used the word SMS to mean mobile text messaging in the Q-sample, as these English-language statements were used in Sweden. The Swedes are familiar with the word SMS. In the Japanese translation, this word has been replaced with its equivalent, Keitai-mail. As stated in Introduction, in this study I use m-mail to mean text messages sent to and received from a mobile phone. The respondents did not see the subheadings and the same numbering scheme as shown here. Instead, they saw a randomly selected number at the end of each statement, which was used for the recording and data entry purposes.

Social network and socializing activity

1) I socialize with people a lot.
2) Frequent communication is not always required to maintain a good relationship.
3) I talk openly about my personal matters and feelings to my friends.
4) I give my mobile phone number only to the people I like.
5) When I talk, I get conscious, but when I send a text message, I don't.
6) I feel left out when I don't receive any SMS messages for a while.
7) I exchange SMS mostly with people at my age.
8) I exchange SMS mostly with people with the same gender.
9) SMS improves my relationships with friends.
10) SMS improves my relationships with family/relatives.

Intimate content

11) I feel comfortable sending personal, intimate messages to my family members or close friends.

12) SMS is good to have when I feel lonely because I can send messages to my friends for no special reasons.

13) A SMS message from my close friend can please or entertain me even when the content is trivial.

14) I send SMS to my friend(s) or family when something good happened to me.

15) I send SMS to my friend(s) or family to tell them I feel sad or depressed.

16) SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings.

17) I send instrumental and informational SMS messages (e.g., "I will be late for the meeting" and "His number is 123-4567.") more often than social and emotional messages (e.g., "thinking of you...," and "how are you doing?").

Interactivity

18) I get frustrated when I don't receive a reply from a person right away after sending a SMS message to that person.

19) It is OK not to reply to an e-mail message as quickly as I do with a SMS message.

Privacy

20) I don't want my family to know whom I communicate with.

21) When I receive a phone call (on a mobile or fixed phone) from my friend or family at inconvenient time, I feel such a call is invasion of privacy.

22) SMS is more private than phone calling because nobody can overhear the voice.

23) Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.

Addiction and dependency

24) I feel lost (don't know what to do) when I go out without my mobile phone.

25) It has become one of my habits to constantly check the mobile phone screen to see if a new message has arrived.

Modality

26) People understand me better when I talk to them on the phone than when I communicate with them by SMS.

27) It is easier to express myself by SMS than by face-to-face or phone interactions.

28) Sometimes I am afraid the receiver may misunderstand my SMS message because it is a written message.

29) I like exchanging SMS messages with my friends and family better than talking with them on the phone.

30) SMS is more important than e-mail to me as a personal communication tool.

31) I can understand some friends better through SMS than by talking with them on the phone or face-to-face.

32) I use SMS when I think I might be intimidated or embarrassed if I made a phone call to someone or met the person face-to-face.

Language

33) Paralanguage, such as face symbols (:-) ;-)) and manipulation of special characters (!!!, ???), can add my emotional state to a SMS message being sent.

34) Misspelling and incorrect grammar are tolerated in SMS.

35) It is OK to use a different (for example, more informal and cryptic) language in SMS than e-mail.

Technology

36) Generally, I like to try new technologies before my friends do.

37) Changes in people's lives due to new telecommunications technologies are inevitable (cannot be avoided).

38) I feel that it sometimes takes too much time to type letters through the keypad of the mobile phone.

39) Transmission delay is a serious disadvantage of SMS.

40) SMS is easy enough for anyone, including old people and computer illiterates, to create and send.

41) It is a serious disadvantage not to be able to use (send and receive) SMS.

42) The characters are too small to read on the mobile phone.

43) It was difficult for me to learn how to use (create, send, and read) SMS.

4.1.3 Descriptions of the Types Identified

In order to build a profile of each type, I extracted two kinds of data from PQMethod reports. One set of data is the three statements the respondents of each type thought the most agreeable (ranked 1, 2, and 3) as well as three least agreeable (ranked 43, 42, and 41) statements. These statements represent three cards placed under the scale point "4" and three cards placed under the point "-4" by the largest majority of respondents of each type. The lists of the statements with the highest and lowest ranking indicate some differences, but some of the statements appear in more than one type on the same (i.e., positive or negative) side. Another set of data is therefore used in order to distinguish one type from the rest. This second set enables to compare characteristics between types.

The statement numbers in the following tables correspond with the numbers above (4.1.2 Q-Statements). In order to compare significance of each statement within and across types, normalized (z) scores are used in these tables. In addition, the tables include factor scores (FS). PQMethod computes factor scores (or Brown calls it the rounded factor scores) according to the forced distribution (i.e., the number of statements each point on the scale must have). In the case of my Q-sort data, three highest z scores in each type have been assigned the factor score 4, four next-highest z scores have the factor score 3, and so on, as shown below:

Factor score	-4	-3	-2	-1	0	1	2	3	4
# statements	3	4	5	6	7	6	5	4	3
	Lowest z								Highest z

The factor score 4 means the most agreeable and the factor score –4 is interpreted the most disagreeable. Lower z scores have the negative polarity. The stronger the level of disagreement, the larger the absolute value of the score but with a negative sign (-). In Tables 4.1-4.16, statements with negative z scores are shaded to indicate that the respondents on that particular type, on average, disagreed with those statements.

4.1.3.1 The Swedish Types

Table 4.1: Statements Characteristic of Practical Users (Swedish Factor 1)

S#	Statement	Practical Users		Young Social Networkers		Veteran E-mail Users		Heavy Female Users	
		FS	Z	FS	Z	FS	Z	FS	Z
	3 most agreeable statements								
26	People understand me better when I talk to them on the phone than when I communicate with them by SMS.	**4**	**1.77**	2		-3		1	
38	I feel that it sometimes takes too much time to type letters through the keypad of the mobile phone.	**4**	**1.55**	1		1		-3	
1	I socialize with people a lot.	**4**	**1.49**	3		4		1	
	3 least agreeable statements								
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	**-4**	**-2.15**	-2		-2		-1	
29	I like exchanging SMS messages with my friends and family better than talking with them on the phone.	**-4**	**-1.74**	-4		-3		-2	
31	I can understand some friends better through SMS than by talking with them on the phone or face-to-face.	**-4**	**-1.48**	-3		-3		-3	
	Distinguishing statements								
26	People understand me better when I talk to them on the phone than when I communicate with them by SMS.	**4**	**1.77 ****	2	0.98	-3	-1.28 **	1	0.22
38	I feel that it sometimes takes too much time to type letters through the keypad of the mobile phone.	**4**	**1.55 ****	1	0.53	1	0.57	-3	-1.39 **
35	It is OK to use a different language in SMS than e-mail.	**3**	**1.46 ****	0	0.35	1	0.65	-1	-0.55 **
17	I send instrumental and informational SMS messages more often than social and emotional ones.	**3**	**1.36 ****	-2	-0.75	-1	-0.39	0	0.17
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	**-4**	**-2.15 ****	-2	-1.12	-2	-0.93	-1	-0.66
5	When I talk, I get conscious, but when I send a text message, I don't.	**-3**	**-1.15 ****	-1	-0.45	-1	-0.57	-1	-0.42
12	SMS is good to have when I feel lonely because I can send messages to my friends for no special reasons.	**0**	**-0.22 ****	2	1.01	2	0.86	2	0.94
18	I get frustrated when I don't receive a reply from a person right away after sending a SMS message to that person.	**0**	**-0.22 ****	2	0.97	2	0.87	2	0.92

Notes: FS = Factor Score, Z = Normalized score, ** Significant at p<.01

Table 4.2: Statements Characteristic of Young Social Networkers (Swedish Factor 2)

S#	Statement	Practical Users		Young Social Networkers ↓		Veteran E-mail Users		Heavy Female Users	
		FS	Z	FS	Z	FS	Z	FS	Z
	3 most agreeable statements								
7	I exchange SMS mostly with people at my age.	1		**4**	**2.05**	1		-3	
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	3		**4**	**1.56**	4		4	
34	Misspelling and incorrect grammar are tolerated in SMS.	2		**4**	**1.35**	0		-3	
	3 least agreeable statements								
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3		**-4**	**-2.08**	-3		-4	
8	I exchange SMS mostly with people with the same gender.	-2		**-4**	**-1.75**	-1		-2	
29	I like exchanging SMS messages with my friends and family better than talking with them on the phone.	-4		**-4**	**-1.57**	-3		-2	
	Distinguishing statements								
7	I exchange SMS mostly with people at my age.	1	0.43	**4**	**2.05** **	1	0.65	-3	-1.58 **
6	I feel left out when I don't receive any SMS messages for a while.	-1	-0.66	**3**	**1.11** **	-2	-0.89	0	0.15
8	I exchange SMS mostly with people with the same gender.	-2	-0.87	**-4**	**-1.75** **	-1	-0.63	-2	-0.83
36	Generally, I like to try new technologies before my friends do.	-1	-0.47	**-3**	**-1.18** **	1	0.49 **	0	-0.33

Notes: FS = Factor Score, Z = Normalized score, ** Significant at p<.01

Table 4.3: Statements Characteristic of Veteran E-mail Users (Swedish Factor 3)

S#	Statement	Practical Users		Young Social Networkers		Veteran E-mail Users ↓		Heavy Female Users	
		FS	Z	FS	Z	FS	Z	FS	Z
	3 most agreeable statements								
1	I socialize with people a lot.	4		3		**4**	**1.97**	1	
11	I feel comfortable sending personal, intimate messages to my family members or close friends.	1		3		**4**	**1.73**	1	
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	3		4		**4**	**1.51**	4	
	3 least agreeable statements								
16	SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings.	0		-2		**-4**	**-1.89**	-4	
23	Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.	-2		-3		**-4**	**-1.74**	1	
42	The characters are too small to read on the mobile phone.	-1		-3		**-4**	**-1.46**	-1	
	Distinguishing statements								
11	I feel comfortable sending personal, intimate messages to my family members or close friends.	1	0.46	3	1.05	**4**	**1.73** **	1	0.61
10	SMS improves my relationships with family/relatives.	-1	-0.43	-1	-0.41	**2**	**0.73** **	-2	-0.67
36	Generally, I like to try new technologies before my friends do.	-1	-0.47	-3	-1.18 **	**1**	**0.49** **	0	-0.33
23	Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.	-2	-0.88	-3	-1.14	**-4**	**-1.74** **	1	0.54 **
26	People understand me better when I talk to them on the phone than when I communicate with them by SMS.	4	1.77 **	2	0.98	**-3**	**-1.28** **	1	0.22
24	I feel lost (don't know what to do) when I go out without my mobile phone.	1	0.61	0	0.09	**-2**	**-1.01** **	4	1.94 **

Notes: FS = Factor Score, Z = Normalized score, ** Significant at p<.01

Table 4.4: Statements Characteristic of Heavy Female Users (Swedish Factor 4) ↓

S#	Statement	Practical Users		Young Social Networkers		Veteran E-mail Users		Heavy Female Users	
		FS	Z	FS	Z	FS	Z	FS	Z
	3 most agreeable statements								
25	It has become one of my habits to constantly check the mobile phone screen to see if a new message has arrived.	1		3		2		**4**	**2.11**
24	I feel lost (don't know what to do) when I go out without my mobile phone.	1		0		-2		**4**	**1.94**
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	3		4		4		**4**	**1.79**
	3 least agreeable statements								
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3		-4		-3		**-4**	**-1.70**
39	Transmission delay is a serious disadvantage of SMS.	-2		0		1		**-4**	**-1.69**
16	SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings.	0		-2		-4		**-4**	**-1.69**
	Distinguishing statements								
25	It has become one of my habits to constantly check the mobile phone screen to see if a new message has arrived.	1	0.62	3	1.16	2	0.95	**4**	**2.11 ****
24	I feel lost (don't know what to do) when I go out without my mobile phone.	1	0.61	0	0.09	-2	-1.01 **	**4**	**1.94 ****
23	Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.	-2	-0.88	-3	-1.14	-4	-1.74 **	**1**	**0.54 ****
39	Transmission delay is a serious disadvantage of SMS.	-2	-0.70	0	-0.38	1	0.42	**-2**	**-0.70 ****
7	I exchange SMS mostly with people at my age.	1	0.43	4	2.05 **	1	0.65	**-3**	**-1.58 ****
38	I feel that it sometimes takes too much time to type letters through the keypad of the mobile phone.	4	1.55 **	1	0.53	1	0.57	**-3**	**-1.39 ****
34	Misspelling and incorrect grammar are tolerated in SMS.	2	1.21	4	1.35	0	-0.04	**-3**	**-1.31 ****
35	It is OK to use a different language in SMS than e-mail.	3	1.46 **	0	0.35	1	0.65	**-1**	**-0.55 ****

Notes: FS = Factor Score, Z = Normalized score, ** Significant at p<.01

Table 4.5: Consensus Statements for Swedish Types -- Those that do not distinguish between any pair of types

S#	Statement	Practical Users		Young Social Networkers		Veteran E-mail Users		Heavy Female Users	
		FS	Z	FS	Z	FS	Z	FS	Z
13 **	A SMS message from my close friend can please or entertain me even when the content is trivial.	3	1.28	4	1.56	4	1.51	4	1.56
31 **	I can understand some friends better through SMS than by talking with them on the phone or face-to-face.	-4	-1.48	-3	-1.26	-3	-1.05	-3	-1.02
21 *	When I receive a phone call from my friend or family at inconvenient time, I feel such a call is invasion of privacy.	-3	-1.27	-2	-0.75	-1	-0.71	-2	-0.94

Note:

**Non-Significant at p>.05 * Non-Significant at p>.01

The characteristics of these four Swedish types revealed through the Q-sorting procedure and their corresponding SPSS data are outlined here. Further discussions on between-type tendencies are made later when they are linked to the Research Questions.

The subjects in the Practical User type (n = 11) are those who tend to prefer talking to writing and use m-mail for rather practical purposes. They think that people understand them better when talking than communicating via m-mail. They feel it is difficult to express themselves by text. They do not get self-conscious when they talk. They send instrumental m-mail messages than emotional ones. For them typing letters on the mobile phone is troublesome. They exchange m-mail messages with friends the least and have used m-mail for the shortest period of time among the four types.

The Young Social Networkers (n = 9), on the other hand, are heavy users of text and voice communications for socializing with same-age friends. They are in the teens, 20s or 30s, mostly students. They communicate with people at the same age, but with both men and women. They do not want to be left out. M-mail for them seems to be one of the means to keep in touch with people and to belong to a social group or groups. They exchange m-mail and e-mail messages with friends a lot. The frequency of the

fixed phone calls with friends is the highest among the types, although phone conversations with family are much less frequent.

The third Swedish type is a group of Veteran E-mail Users (n = 8) who may not necessarily like to talk. They think m-mail improves the relationship with family. They have been using e-mail for the longest period of time and exchange e-mail messages with family the most among the four types. They suspect that people may not understand them when they talk. But they feel comfortable writing personal notes. They also think that they can get by without the mobile phone.

The last Swedish type, Heavy Female Users, consists of four female subjects. They are proper and heavy m-mail communicators. They send and receive m-mail messages to and from friends and family the most among the four types. They also make and receive mobile phone calls to/from family the most and have owned the mobile phone for the longest period of time among the four types. They strongly feel that they need the mobile phone all the time. They look at the mobile phone screen frequently for checking new message arrival. Typing characters on the mobile phone is not a big problem for them. They think that even in a m-mail message correct grammar must be used and words must be spelled right. They communicate with various age groups.

The statistical data on these types' communication tool use are in Tables 5.1, 5.2, and 5.3 in Discussion.

4.1.3.2 The Japanese Types

I follow the same steps as Section 4.1.3.1 above to describe the Japanese and combined types. A larger number of distinguishing statements than shown in the Sweden section are listed below because the Japanese respondents seem to be more diverse in their Q-sort responses than the Swedish counterparts.

Table 4.6: Statements Characteristic of Non-believers (Japanese Factor 1)

S#	Statement	Non-believers		Emotional Users		Student-like Heavy Users		Reserved Writers	
		FS	Z	FS	Z	FS	Z	FS	Z
	3 most agreeable statements								
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	**4**	**2.07**	4		3		4	
37	Changes in people's lives due to new telecom technologies are inevitable.	**4**	**1.98**	0		0		4	
1	I socialize with people a lot.	**4**	**1.47**	1		3		-1	
	3 least agreeable statements								
29	I like exchanging SMS messages with friends/family better than talking with them on the phone.	**-4**	**-1.76**	-3		1		0	
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	**-4**	**-1.71**	-3		1		2	
31	I can understand some friends better through SMS than by talking with them on the phone or face-to-face.	**-4**	**-1.59**	-2		0		-1	
	Distinguishing statements								
38	It takes too much time to type letters through the keypad of the mobile phone.	**3**	**1.46 ****	2	0.88	-2	-0.49 *	0	0.14
26	People understand me better when I talk to them on the phone than SMS.	**3**	**1.41 ****	1	0.37	1	0.50	-2	-1.00 **
36	Generally, I like to try new technologies before my friends do.	**2**	**1.14 ****	-4	-1.67 **	-1	-0.80	1	0.35
17	I send instrumental / informational SMS messages more often than social/ emotional messages.	**2**	**1.00 ****	-4	-1.77	-2	-0.93	-4	-1.57
29	I like exchanging SMS messages with friends/family better than talking with them on the phone.	**-4**	**-1.76 ****	-3	-1.39	1	0.55	0	0.16
27	It is easier to express myself by SMS than FtF/phone interactions.	**-4**	**-1.71 ****	-2	-1.21	1	0.57	2	0.86
31	I can understand some friends better through SMS than by talking with them on the phone or face-to-face.	**-4**	**-1.59 ****	-2	-0.91	0	0.26 *	-1	-0.37
30	SMS is more important than e-mail to me as a personal cmu tool.	**-3**	**-1.47 ****	1	0.30	1	0.35	0	0.18
10	SMS improves my relationships with family/relatives.	**-3**	**-1.16 ****	-1	-0.34	0	0.17	1	0.53
15	I send SMS to my friend(s)/family to tell them I feel sad or depressed.	**-3**	**-1.10 ***	3	1.27 **	-1	-0.56	-1	-0.55
9	SMS improves my relationships with friends.	**-1**	**-0.72 ****	2	0.82	4	1.51	3	1.03

Notes: * Significant at p<.05, ** Significant at p<.01

Table 4.7: Statements Characteristic of Emotional Users (Japanese Factor 2)

S#	Statement	Non-believers		Emotional Users ↓		Student-like Heavy Users		Reserved Writers	
		FS	Z	FS	Z	FS	Z	FS	Z
	3 most agreeable statements								
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	4		**4**	**2.17**	3		4	
14	I send SMS to my friend(s) or family when something good happened to me.	0		**4**	**1.57**	2		0	
11	I feel comfortable sending personal, intimate messages to my family members or close friends.	2		**4**	**1.57**	3		3	
	3 least agreeable statements								
17	I send instrumental / informational SMS messages more often than social/ emotional messages.	2		**-4**	**-1.77**	-2		-3	
16	SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings	0		**-4**	**-1.68**	-2		-3	
36	Generally, I like to try new technologies before my friends do.	3		**-4**	**-1.67**	-2		1	
	Distinguishing statements								
14	I send SMS to my friend(s) or family when something good happened to me.	0	0.03	**4**	**1.57** **	2	0.89	0	0.16
15	I send SMS to my friend(s) or family to tell them I feel sad or depressed.	-3	-1.10 **	**3**	**1.27** **	-1	-0.56	-1	-0.55
24	I feel lost (don't know what to do) when I go out without my mobile phone.	-1	-0.50	**1**	**0.81** **	-3	-1.14 **	-2	-0.73
36	Generally, I like to try new technologies before my friends do.	3	1.14 **	**-4**	**-1.67** **	-1	-0.80	1	0.35
39	Transmission delay is a serious disadvantage of SMS.	2	0.70	**-1**	**-0.58** **	2	0.72	1	0.33

Notes: FS = Factor Score, Z = Normalized score, ** Significant at p<.01

Table 4.8: Statements Characteristic of Student-like Heavy Users (Japanese Factor 3)

S#	Statement	Non-believers		Emotional Users		Student-like Heavy Users ↓		Reserved Writers	
		FS	Z	FS	Z	FS	Z	FS	Z
	3 most agreeable statements								
7	I exchange SMS mostly with people at my age.	1		0		**4**	**1.87**	1	
3	I talk openly about my personal matters and feelings to my friends.	2		2		**4**	**1.61**	-2	
9	SMS improves my relationships with friends.	-1		2		**4**	**1.51**	3	
	3 least agreeable statements								
23	Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.	-2		-3		**-4**	**-2.03**	-3	
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3		-2		**-4**	**-1.89**	-4	
42	The characters are too small to read on the mobile phone.	0		-3		**-4**	**-1.83**	-4	
	Distinguishing statements								
7	I exchange SMS mostly with people at my age.	1	0.65	0	0.10	**4**	**2.03 ****	1	0.49
3	I talk openly about my personal matters and feelings to my friends.	2	1.02	2	0.95	**4**	**1.61 ****	-2	-1.06 **
34	Misspelling and incorrect grammar are tolerated in SMS.	-2	-0.87	0	-0.03	**2**	**0.63 ****	-2	-1.11
23	Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.	-2	-0.79	-3	-1.12	**-4**	**-2.03 ****	-3	-1.43
21	When I receive a phone call (on a mobile or fixed phone) from my friend or family at inconvenient time, I feel such a call is invasion of privacy.	-1	-0.37	-2	-0.85	**-3**	**-1.48 ****	2	0.61 **
24	I feel lost (don't know what to do) when I go out without my mobile phone.	-1	-0.50	1	0.81	**-3**	**-1.41 ****	-2	-0.73
18	I get frustrated when I don't receive a reply from a person right away after sending a SMS message to that person.	1	0.03	0	-0.08	**-3**	**-1.31 ****	3	1.12 **

Notes: FS = Factor Score, Z = Normalized score, ** Significant at p<.01

Table 4.9: Statements Characteristic of Reserved Writers (Japanese Factor 4)

S#	Statement	Non-believers		Emotional Users		Student-like Heavy Users		Reserved Writers	
		FS	Z	FS	Z	FS	Z	FS	Z
	3 most agreeable statements								
37	Changes in people's lives due to new telecommunications technologies are inevitable (cannot be avoided).	4		0		0		4	1.93
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	4		4		3		4	1.73
32	I use SMS when I think I might be intimidated or embarrassed if I made a call to someone or met the person FtF.	-1		0		0		4	1.66
	3 least agreeable statements								
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3		-2		-4		-4	-2.07
42	The characters are too small to read on the mobile phone.	0		-3		-4		-4	-1.79
4	I give my mobile phone number only to the people I like.	1		-1		-2		-4	-1.61
	Distinguishing statements								
32	I use SMS when I think I might be intimidated or embarrassed if I made a call to someone or met the person FtF.	-1	-0.29 *	0	0.09	0	0.25	4	1.66 **
18	I get frustrated when I don't receive a reply from a person right away.	1	0.03	0	-0.08	-3	-1.31 **	3	1.12 **
20	I don't want my family to know whom I communicate with.	1	0.36	-2	-0.71	-1	-0.47	2	0.92 *
6	I feel left out when I don't receive any SMS messages for a while.	-2	-0.90	1	0.42	-3	-1.03	2	0.88 *
21	When I receive a call from my friend or family at inconvenient time, I feel such a call is invasion of privacy.	-1	-0.37	-2	-0.85	-3	-1.48 **	2	0.61 **
5	When I talk, I get conscious, but when I send a text message, I don't.	-2	-0.83	-1	-0.57	-2	-0.81	1	0.50 **
4	I give my mobile phone number only to the people I like.	1	0.17	-1	-0.56	-2	-0.91	-4	-1.61 **
8	I exchange SMS mostly with people with the same gender.	0	-0.09	0	-0.09	2	0.75	-3	-1.39 **
3	I talk openly about my personal matters and feelings to my friends.	2	1.02	2	0.95	4	1.61 **	-2	-1.06 **
26	People understand me better when I talk to them on the phone than when I communicate with them by SMS.	3	1.41 **	1	0.37	1	0.50	-2	-1.00 **
2	Frequent communication is not always required to maintain a good relationship.	2	1.00	2	0.96	1	0.36	-2	-0.76 **

Notes: * Significant at p<.05, ** Significant at p<.01

Table 4.10: Consensus Statements for Japanese Types -- Those that do not distinguish between any pair of types

S#	Statement	Non-believers		Emotional Users		Student-like Heavy Users		Reserved Writers	
		FS	Z	FS	Z	FS	Z	FS	Z
35 **	It is OK to use a different (for example, more informal and cryptic) language in SMS than e-mail.	0	-0.12	0	-0.27	0	-0.01	-1	-0.08
25 *	It has become one of my habits to constantly check the mobile phone screen to see if a new message has arrived.	1	0.61	2	1.01	2	0.60	2	0.87

Note:
* Non-Significant at p>.01 **Non-Significant at p>.05

The group of non-believers of m-mail (n = 18) has the largest number of subjects in the Japanese sample. Although they are generally early adopters of technologies, typing text on the mobile phone is troublesome for them. They think people understand them better when they talk than when they send text messages. They would rather talk than send text messages and they feel that it is more difficult to express themselves in m-mail. Content of m-mail they send to friends and family is therefore mostly about practical matters. They do not believe that m-mail improves relationships with friends and family. Males dominate this group (13 males versus 5 females). Most of them bought the mobile phone for the reasons other than m-mail. They have used m-mail for the shortest period of time, although they have owned the mobile phone for the longest period of time, among the four types. They exchange m-mail messages with friend the least among the four types. Most of them have not changed their use of FtF meetings and phone calls. They depend on the fixed phone more than the other three types and on m-mail the least.

The subjects in the second type, Emotional Users (n = 13), seem to have a high-level of self-disclosure. They are not technology-savvy people. They send personal m-mail messages to convey emotional feelings. They want to keep their mobile phones

with them all the time. Their use of the communication tools is neither the highest nor the lowest. There is one negatively loaded subject in this type, who is a teenage male college student. (See Appendix G.) He chose some distinguishing statements for this type in the way almost opposite to the rest of the members on this group did. He seems to have the opposite characteristics this type represents.

The third type identified is Student-like, Heavy M-mail Users (n = 8). Although two of eight members of this type are full-time employees (i.e., non-students), all are in the teens or 20s, three males and five females. They have been using m-mail for the longest period of time among the four types. They send and receive more m-mail messages to/from friends, mostly at the same age, each day than any other Japanese and Swedish types. They depend on m-mail more than phone calls, e-mail, FtF meetings, and letters. Paradoxically, however, they are not frustrated when their m-mail is not returned right away, and they would not feel lost without the mobile phone. They would like to constantly keep in touch with friends, so that they are not sensitive about privacy.

The last type in the Japanese sample is Reserved Writers, comprising five females and two males. They use m-mail partly because that way they could avoid intimidation and talking and keep privacy. They do not openly talk personal matters with friends, and do not believe frequent communication is always necessary to maintain relationships. They get self-conscious when they talk. They think people may not necessarily understand them when they talk. On the other hand, the members of this type have another facet as communicators. They give out their mobile phone numbers to everybody, they get frustrated when their m-mail is not returned right away, and they feel left out when they do not receive m-mail for a while. They are the biggest spenders on mobile communication. Their use of the telephone has decreased since they started using m-mail.

Interestingly, the Japanese and Swedish types appear to be in most part distinctive from one another when they are compared as two separate data sets. Some characteristics overlap but no pair would exactly match. Each of these eight types

differs from the rest in certain aspects. For example, four of the distinguishing statements are common in the Japanese Non-believers and Swedish Practical Users, but the characteristics of the former are more clearly defined and the members in this type seem to believe more strongly than Practical Users that m-mail is nothing to do with actual relationships.

When the Swedish and Japanese samples are combined into a single data set, two Swedish types, Young Social Networkers and Heavy Female Users, shift to The Realistic Majority and Heavy Voice & Data Users respectively, while the remaining six types are divided into two or three components. Thus, combining two data sets has formed a new set of types, keeping certain characteristics of the dominant type. The city and gender are two demographic variables that resulted in variance in the structure of the types. More discussions on other characteristics follow. Figure 4.4 illustrates how the combined types are made up.

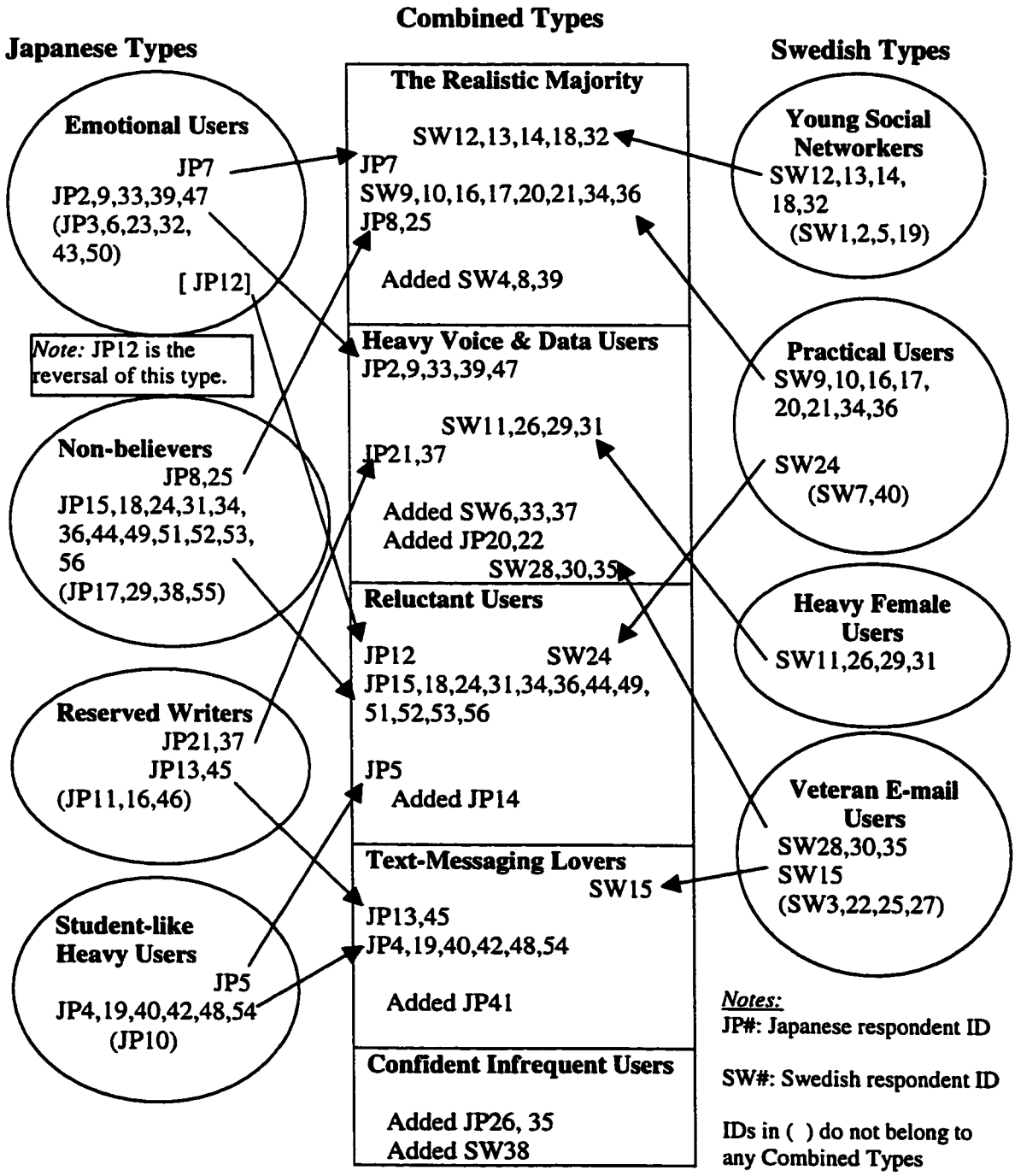


Figure 4.4: Members of Combined Types

4.1.3.3 The Combined Types

Table 4.11: Statements Characteristic of The Realistic Majority (Combined Factor 1)

S#	Statement	Realistic Majority		Heavy V & D Users		Reluctant Users		Text-Messaging Lovers		Confident Infrequent Users	
		FS	Z	FS	Z	FS		FS	Z	FS	Z
	3 most agreeable										
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	**4**	**1.66**	4		4		4		4	
26	People understand me better through the phone than SMS.	**4**	**1.63**	-1		3		-1		0	
1	I socialize with people a lot.	**4**	**1.61**	3		3		3		4	
	3 least agreeable										
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	**-4**	**-2.07**	-2		-4		3		-4	
29	I like exchanging SMS with my friends and family better than calling..	**-4**	**-2.00**	-2		-3		0		-1	
31	I can understand some friends better through SMS than by talking with them on the phone or face-to-face.	**-4**	**-1.52**	-3		-3		1		-2	
	Distinguishing statements										
26	People understand me better through the phone than SMS.	**4**	**1.63 ****	-1	.28	3	1.04	-1	-.08	0	-.11
34	Misspelling and incorrect grammar are tolerated in SMS.	**3**	**1.54 ****	-2	-.81	-4	-1.51 **	2	.77	1	.48
35	It is OK to use a different (for example, more informal and cryptic) language in SMS than e-mail.	**3**	**1.39 ****	0	-.23	0	-.11	0	.14	-1	-.46
24	I feel lost (don't know what to do) when I go out without my mobile phone.	**2**	**.78 ***	1	.43	-2	-1.00	-3	-1.05	-4	-1.86
29	I like exchanging SMS with my friends and family better than calling.	**-4**	**-2.00 ****	-2	-.80	-3	-1.25	0	.24	-1	-.65
22	SMS is more private than phone calling because nobody can overhear the voice.	**-3**	**-1.13 ****	2	.73	-1	-.27	-1	-.21	2	1.11

Notes: * Significant at p<.05, ** Significant at p<.01

Table 4.12: Statements Characteristic of The Heavy Voice & Data Users (Combined Factor 2)

S#	Statement	Realistic Majority		Heavy V & D Users		Reluctant Users		Text-Messaging Lovers		Confident Infrequent Users	
		FS	Z	FS	Z	FS		FS	Z	FS	Z
	3 most agreeable										
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	4		4	1.97	4		4		4	
12	SMS is good to have when I feel lonely because I can send messages to my friends for no special reasons.	0		4	1.71	1		1		-1	
3	I talk openly about my personal matters and feelings to my friends.	2		4	1.56	2		2		4	
	3 least agreeable										
16	SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings.	-1		-4	-2.12	0		-2		2	
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3		-4	-1.74	-4		-4		2	
42	The characters are too small to read on the mobile phone.	-1		-4	-1.40	-2		-4		1	
	Distinguishing statements										
12	SMS is good to have when I feel lonely because I can send messages to my friends for no special reasons.	0	.07	4	1.71 **	1	.37	1	.36	-1	-.41
18	I get frustrated when I don't receive a reply from a person right away after sending a SMS message to that person.	1	.29	2	.74 **	0	-.06	-3	-1.25	-2	-.81
6	I feel left out when I don't receive any SMS messages for a while.	0	-.04	1	.43 **	-2	-.90	-2	-.78	-2	-1.07
16	SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings.	-1	-.70	-4	-2.12 **	0	.14	-2	-.91	2	.67

Notes: ** Significant at p<.01

Table 4.13: Statements Characteristic of Reluctant Users (Combined Factor 3)

S#	Statement	Realistic Majority		Heavy V & D Users		Reluctant Users ↓		Text-Messaging Lovers		Confident Infrequent Users	
		FS	Z	FS	Z	FS		FS	Z	FS	Z
	3 most agreeable										
37	Changes in people's lives due to new telecommunications technologies are inevitable (cannot be avoided).	1		1		4	2.34	0		0	
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	4		4		4	1.80	4		4	
36	Generally, I like to try new technologies before my friends do.	-3		-1		4	1.63	-3		-3	
	3 least agreeable										
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3		-4		-4	-1.65	-4		2	
34	Misspelling and incorrect grammar are tolerated in SMS.	3		-2		-4	-1.51	2		1	
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	-4		-2		-4	-1.46	3		-4	
	Distinguishing statements										
37	Changes in people's lives due to new telecommunications technologies are inevitable.	1	.70	1	.28	4	2.34 **	0	.30	0	.11
36	Generally, I like to try new technologies before my friends do.	-3	-1.09	-1	-.56	4	1.63 **	-3	-1.20	-3	-1.46
20	I don't want my family to know whom I communicate with.	-2	-.79	1	.30	1	.79 **	-2	-.87	-1	-.20
34	Misspelling and incorrect grammar are tolerated in SMS.	3	1.54 **	-2	-.81	-4	-1.51 **	2	.77	1	.48
15	I send SMS to my friend(s) or family to tell them I feel sad or depressed.	-1	-.33	1	.38	-3	-1.17 **	-1	-.62	0	-.02

Notes: ** Significant at p<.01

Table 4.14: Statements Characteristic of Text-Messaging Lovers (Combined Factor 4)

S#	Statement	Realistic Majority		Heavy V & D Users		Reluctant Users		Text-Messaging Lovers		Confident Infrequent Users	
		FS	Z	FS	Z	FS		FS	Z	FS	Z
	3 most agreeable										
7	I exchange SMS mostly with people at my age.	2		-1		2		4	2.17	1	
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	4		4		4		4	1.44	4	
9	SMS improves my relationships with friends.	0		3		-1		4	1.41	-1	
	3 least agreeable										
42	The characters are too small to read on the mobile phone.	-1		-4		-2		-4	-2.03	1	
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3		-4		-4		-4	-1.99	2	
23	Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.	-2		-3		-1		-4	-1.83	-2	
	Distinguishing statements										
7	I exchange SMS mostly with people at my age.	2	.91	-1	-.37	2	.88	4	2.17 **	1	.33
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	-4	-2.07	-2	-.71	-4	-1.46	3	1.06 **	-4	-1.57
31	I can understand some friends better through SMS than by talking with them on the phone or face-to-face.	-4	-1.52	-3	-1.03	-3	-1.29	1	.66 **	-2	-.87
42	The characters are too small to read on the mobile phone.	-1	-.74	-4	-1.40	-2	-.84	-4	-2.03 **	1	.41
23	Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.	-2	-.87	-3	-1.34	-1	-.80	-4	-1.83 **	-2	-1.05
21	When I receive a phone call from my friend or family at inconvenient time, I feel such a call is invasion of privacy.	-2	-1.01	-3	-.98	-1	-.66	-3	-1.69 **	0	.00

Notes: ** Significant at p<.01

Table 4.15: Statements Characteristic of Confident Infrequent Users (Combined Factor 5)

S#	Statement	Realistic Majority		Heavy V & D Users		Reluctant Users		Text-Messaging Lovers		Confident Infrequent Users ↓	
		FS	Z	FS	Z	FS		FS	Z	FS	Z
	3 most agreeable										
1	I socialize with people a lot.	4		3		3		3		4	1.75
3	I talk openly about my personal matters and feelings to my friends.	2		4		2		2		4	1.51
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	4		4		4		4		4	1.51
	3 least agreeable										
24	I feel lost (don't know what to do) when I go out without my mobile phone.	2		1		-2		-3		-4	-1.86
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	-4		-2		-4		3		-4	-1.57
41	It is a serious disadvantage not to be able to use SMS.	0		0		-1		0		-4	-1.57
	Distinguishing statements										
39	I give my mobile phone number only to the people I like.	0	-.06	-2	-.77	0	-.13	-2	-.79	3	1.35 **
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3	-1.22	-4	-1.74	-4	-1.65	-4	-1.99	2	1.07 **
24	I feel lost (don't know what to do) when I go out without my mobile phone.	2	.78	1	1.43	-2	-1.00	-3	-1.05	-4	-1.86 **
41	It is a serious disadvantage not to be able to use SMS.	0	.05	0	-.21	-1	-.34	0	-.03	-4	-1.57 **
25	It has become one of my habits to constantly check the mobile phone screen to see if a new message has arrived	1	.70	2	1.05	2	.94	2	.80	-3	-1.55 **
32	I use SMS when I think I might be intimidated or embarrassed if I made a phone call or met someone FtF.	0	-.09	0	-.06	0	.05	1	.34	-3	-1.16 **

Notes: ** Significant at p<.01

There were no consensus statements for the combined types. However, a few statements seem to have answered similarly. For example, all types rated high (positive) for the statement # 13 (A SMS message from my close friend can please or entertain me even when the content is trivial) and #1 (I socialize with people a lot).

Since these types represent realignment of various parts of characteristics of the Swedish and Japanese types, one could be easily confused with the description of these combined types with the in-country type descriptions. In order to better understand patterns of each type in the combined sample, an additional table is used as a reference (Table 4.16). This is the factor score array table. As Brown (1980) asserts, factor scores can be used as a convenient tool to compare types for certain statements.

Table 4.16: Factor Scores of Each Statement for Combined Types

#	Statement	F1	F2	F3	F4	F5
1	I socialize with people a lot.	4	3	3	3	4
2	Frequent communication is not always required to maintain a good relationship.	1	0	2	0	2
3	I talk openly about my personal matters and feelings to my friends.	2	4	2	2	4
4	I give my mobile phone number only to the people I like.	0	-2	0	-2	3
5	When I talk, I get conscious, but when I send a text message, I don't.	-3	-1	-2	-1	1
6	I feel left out when I don't receive any SMS messages for a while.	0	1	-2	-2	-2
7	I exchange SMS mostly with people at my age.	2	-1	2	4	1
8	I exchange SMS mostly with people with the same gender.	-2	-3	1	2	0
9	SMS improves my relationships with friends.	0	3	-1	4	-1
10	SMS improves my relationships with family/relatives.	-1	0	-3	0	-2
11	I feel comfortable sending personal, intimate messages to my family members or close friends.	3	3	0	3	3
12	SMS is good to have when I feel lonely because I can send messages to my friends for no special reasons.	0	4	1	1	-1
13	A SMS message from my close friend can please or entertain me even when the content is trivial.	4	4	4	4	4
14	I send SMS to my friend(s) or family when something good happened to me.	1	3	1	2	3
15	I send SMS to my friend(s) or family to tell them I feel sad or depressed.	-1	1	-3	-1	0
16	SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings.	-1	-4	0	-2	2
17	I send instrumental and informational SMS messages more often than social and emotional messages.	0	-2	3	-2	3
18	I get frustrated when I don't receive a reply from a person right away after sending a SMS message to that person.	1	2	0	-3	-2
19	It is OK not to reply to an e-mail message as quickly as I do with a SMS message.	2	0	0	0	2
20	I don't want my family to know whom I communicate with.	-2	1	1	-2	-1
21	When I receive a phone call (on a mobile or fixed phone) from my friend or family at inconvenient time, I feel such a call is invasion of privacy.	-2	-3	-1	-3	0
22	SMS is more private than phone calling because nobody can overhear the voice.	-3	2	-1	-1	2
23	Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime.	-2	-3	-1	-4	-2

(To be continued to the next page)

Table 4.16 continued

#	Statement	F1	F2	F3	F4	F5
24	I feel lost when I go out without my mobile phone.	2	1	-2	-3	-4
25	It has become one of my habits to constantly check the mobile phone screen to see if a new message has arrived.	1	2	2	2	-3
26	People understand me better when I talk to them on the phone than when I communicate with them by SMS.	4	-1	3	-1	0
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	-4	-2	-4	3	-4
28	Sometimes I am afraid the receiver may misunderstand my SMS message because it is a written message.	2	1	2	-1	0
29	I like exchanging SMS messages with my friends and family better than talking with them on the phone.	-4	-2	-3	0	-1
30	SMS is more important than e-mail to me as a personal communication tool.	-2	2	-2	1	-3
31	I can understand some friends better through SMS than by talking with them on the phone or face-to-face.	-4	-3	-3	1	-2
32	I use SMS when I think I might be intimidated or embarrassed if I made a phone call to someone or met the person face-to-face.	0	0	0	1	-3
33	Paralanguage can add my emotional state to a SMS message being sent.	1	2	1	3	1
34	Misspelling and incorrect grammar are tolerated in SMS.	3	-2	-4	2	1
35	It is OK to use a different (for example, more informal and cryptic) language in SMS than e-mail.	3	0	0	0	-1
36	Generally, I like to try new technologies before my friends do.	-3	-1	4	-3	-3
37	Changes in people's lives due to new telecommunications technologies are inevitable (cannot be avoided).	1	1	4	0	0
38	I feel that it sometimes takes too much time to type letters through the keypad of the mobile phone.	3	-1	3	-1	-1
39	Transmission delay is a serious disadvantage of SMS.	-1	-1	1	1	1
40	SMS is easy enough for anyone, including old people and computer illiterates, to create and send.	-1	0	-1	1	0
41	It is a serious disadvantage not to be able to use SMS.	0	0	-1	0	-4
42	The characters are too small to read on the mobile phone.	-1	-4	-2	-4	1
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3	-4	-4	-4	2

The subjects of the first type are The Realistic Majority (n = 19). This group comprises 16 Swedes and three Japanese. Gender and age are spread. They have been using the mobile phone and e-mail for the longest period of time among the five types. They send and receive e-mail messages to/from friends and family the most among the

five types. They spend the least for mobile communications among the five types. They prefer talking to sending m-mail. They feel lost without the mobile phone. The level of their e-mail use indicates that since they are accustomed to exchanging electronic messages for a long time, the relatively new phenomenon of m-mail is accepted, but their use of m-mail is somewhat limited. They do not fully embrace m-mail and depend on other means to communicate. They view m-mail as a new communication tool that does not require rigid rules. Misspelling, incorrect grammar, and using a different language from e-mail are acceptable.

The second type, Heavy Voice & Data Users, does not want to be left out and uses communication tools, such as m-mail, to release loneliness. This group comprises the same number of subjects (n = 19) as The Realistic Majority. The demographic characteristics (city, gender and age) of Heavy Voice & Data Users are most balanced among the five types. They use m-mail a lot, although not at the heaviest level. They are the most frequent users of the mobile phone calls to and from friends and family among the five types. Naturally, they are the largest spenders on mobile communications. They have the most positive attitude toward m-mail among the five types. They tend to think that m-mail is rather personal, natural, and sociable. They get frustrated when they do not receive return m-mail right away. They tend to openly talk about personal matters and believe that m-mail improves their relationship with friends. For them, m-mail is more important than e-mail. They communicate with both males and females via m-mail.

Japanese males dominate Reluctant Users (n = 16). They are fatalistic and accept the fact that technology changes people's lives. They are rather early adopters of new technology. But they do not believe m-mail would improve relationships with family and friends. Most of them (15 of 16) have never developed new friendship through m-mail, and the majority (12) thinks that they could maintain their relationships with friends without m-mail. For them, typing text on the mobile phone takes too much time. They think that people understand them better by talking than by sending m-mail, and that content of their m-mail may be misunderstood. However, they have a

contradictory behavior: They communicate with friends via mobile phones and fixed phones the least frequently among the five types.

The fourth type consists of Text-Messaging Lovers (n = 10). The members of this type are mostly Japanese females. All members are in their teens or 20s. Eight of ten are students (three high school and five college students). They use m-mail with friends most frequently among the five types. They mainly communicate with the same-gender friends via m-mail. They feel that it is easier to express themselves by m-mail than by FtF or phone conversations. Text-Messaging Lovers use paralanguage extensively to add emotional expressions to their m-mail messages. They believe that m-mail can improve their relationships with friends. M-mail was a motive for mobile phone purchase for nine subjects. They can be always accessible, and for them, being contacted is not invasion of privacy. These heavy text-messaging users have used m-mail for the longest period of time, even though this is the youngest group. They most depend on m-mail and least depend on the fixed phone for their communication needs. Indeed, their use of the fixed phone to/from family is the least among the five types.

The last type, Confident Infrequent Users, is a small group of three female subjects, one (50s) from Stockholm and two (30s and 40s) from Tokyo. They are confident non-communicators of m-mail, who keep the traditional ways of communicating (i.e., FtF, the telephone, and e-mail). They exchange m-mail with friends the least and have used m-mail for the shortest period of time among the five types. It was difficult for them to learn how to use m-mail. They also depend on m-mail the least. None of them have ever made new friends through m-mail. They do not believe that not being able to use m-mail is a serious disadvantage. All think that they can maintain the same relationships with friends and family without m-mail. They are also comfortable with not carrying their mobile phones around all the time. They, however, use the fixed phone to/from friends the most among the five types. They can openly talk about their personal matters with friends. And they can be sociable. They do not fear of intimidation when they talk. M-mail for them is for exchanging practical information without emotions, unlike their telephone, and perhaps FtF, conversations.

4.2 Descriptions of the Sample Estimated by Survey Results

4.2.1 Demographics

This section (4.2) examines the sample using the data obtained from the survey. In the discussion on the types above (Section 4.1), those who do not belong to any type were excluded from analysis. In this section, all respondents are accounted for in order to describe the whole sample as well as certain demographic groups.

Of the 96 respondents (40 in Stockholm and 56 in Tokyo), 53.1% are male (Stockholm 52.5%, Tokyo 53.6%) and 46.9% are female (Stockholm 47.5%, Tokyo 46.4%). In terms of age, 59.4% are in their teens or 20s (Stockholm 50.0%, Tokyo 58.9%). About a half of the respondents are students--20.8% are high-school students (Stockholm 22.5%, Tokyo 19.6%), and 31.2% (Stockholm 32.5%, Tokyo 30.4%) are college/graduate students. The variations of gender, age, and occupation between two cities are not statistically significant. A major reason for that is because I purposefully requested my contacts in both countries to recruit people in certain age groups and to make 50% of the sample non-students. I used purposive sampling, in addition to snowball sampling, to ensure that my sample would include all age groups, both males and females, and various occupations. The following graphs (Figures 4.5, 4.6, and 4.7) illustrate the demographic characteristics of the respondents:

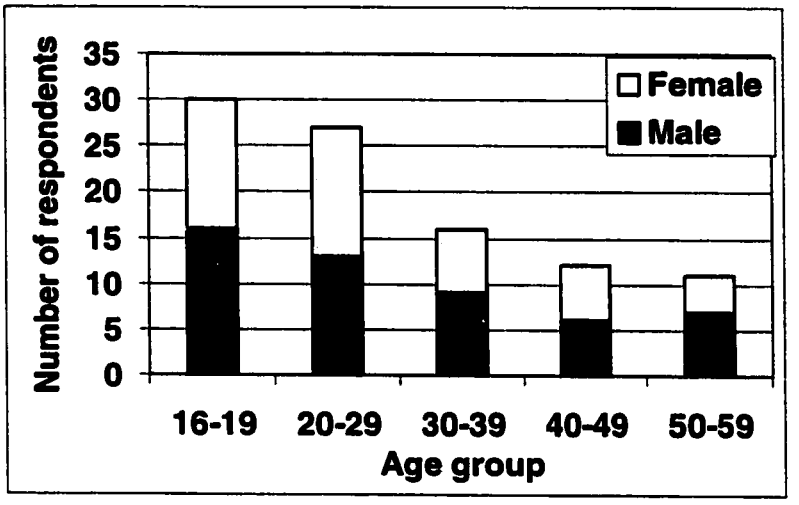


Figure 4.5: Number of Respondents by Age and Gender (n=96)

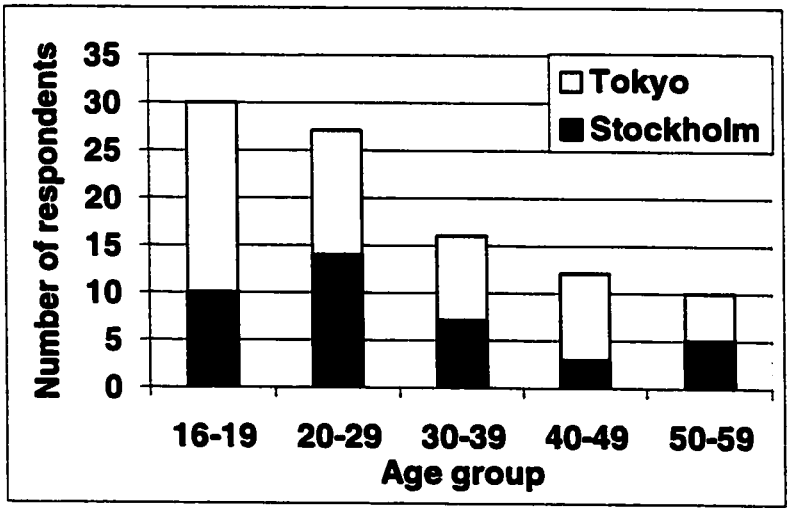


Figure 4.6: Number of Respondents by Age and City (n=96)

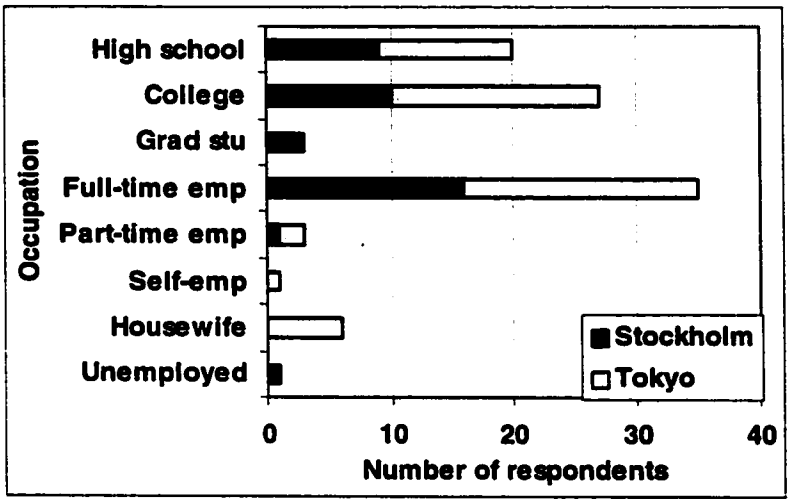


Figure 4.7: Number of Respondents by Occupation and City (n=96)

Cross tabulation of the family structure in Sweden and Japan has revealed that variance is statistically significant (χ^2=15.91, p<.026). The Japanese respondents seem to have more members in their households. For example, four Swedish and 16 Japanese respondents live with spouses and children, six Swedish and 13 Japanese respondents live with parents and siblings. Three Japanese teenagers additionally list their grandmothers in their respective households. Particularly in the 30-39 age group, the difference is contrasting (χ^2=9.00, p<.011). Five of seven Swedish respondents in the 30s live alone, while eight of nine Japanese counterparts live with their spouses and children. Overall, 32 are living alone (14 in Stockholm and 18 in Tokyo) and the rest are living with family or roommates. Variance in the family structure may make a difference as to how often they use communication tools to communicate among themselves. If they live apart, they may have to rely on such tools to keep in touch with each other, while if they live together, as many do in Japan, daily face-to-face communication may be suffice under the normal circumstances.

4.2.2 Communication use

All 96 respondents use text messaging in varying degrees, as I recruited users, not nonusers. On an average, they send 5.97 messages to their friends and receive 6.17 messages from their friends each day. Communication with their family members by text messaging is much less popular. They send less than one (0.92) message and receive less than one (0.94) per day. The difference of the means between two cities for sending and receiving m-mail messages to/from friends is statistically significant, although m-mail exchange with family does not have significant variance. The Japanese respondents send and receive significantly more messages when communicating with friends. They send 8.37 messages and receive 8.71 messages to/from friends each day on an average. Twenty-two respondents send more than ten and received more than ten per day. However, this inter-city trend is reversed for mobile phone, telephone, and e-mail communication. Swedish respondents make significantly more mobile phone calls with family and fixed-phone calls with family and friends and send/receive significantly more e-mail messages to/from family. Although the length of mobile phone use by the Stockholm and Tokyo respondents is close to each other, the Swedish respondents have used text messaging and e-mail for longer periods of time than the Japanese counterparts. Text messaging technology (SMS) has been available since early 1990s in Sweden as part of the GSM specifications, while Japan's proprietary wireless technology did not allow text messaging until late 1990s. Electronic messaging on the PC for residential users is also a relatively recent phenomenon in Japan.

A summary of the means of the above-mentioned communication use items by city are shown in Table 4.17 below:

Table 4.17 Means of Communication Use by City

Communication use	Stockholm	Tokyo	Overall	F	p<
# m-mail messages sent to friends	2.61	8.37	5.97	10.28	.002**
# m-mail messages received from friends	2.64	8.71	6.18	11.17	.001**
# m-mail messages sent to family	1.20	.72	.92	3.35	.071 ms
# m-mail messages received from family	1.21	.75	.94	3.04	.085 ms
# mobile phone calls to friends	2.26	1.83	2.01	.38	ns
# mobile phone calls from friends	2.80	1.96	2.31	.86	ns
# mobile phone calls to family	1.43	.67	.98	12.21	.001**
# mobile phone calls from family	1.72	.84	1.21	14.79	.000**
# phone calls to friends	1.97	.54	1.13	24.06	.000**
# phone calls from friends	1.77	.59	1.08	18.81	.000**
# phone calls to family	1.18	.45	.75	21.58	.000**
# phone calls from family	1.13	.50	.76	15.94	.000**
# e-mail messages sent to friends	3.47	1.78	2.60	1.63	ns
# e-mail messages received from friends	3.58	1.82	2.68	1.79	ns
# e-mail messages sent to family	.89	.19	.53	8.96	.004**
# e-mail messages received from family	.89	.19	.53	8.83	.004**
# years e-mail has been used	5.96	4.03	4.95	6.73	.011*
# years m-mail has been used	2.95	2.04	2.41	11.79	.001**
# years mobile phone has been used	4.07	3.69	3.84	.68	ns

Note:

n=96 (Stockholm 40 and Tokyo 56) for m-mail message and use, mobile phone calls and use, and phone calls
n=82 (Stockholm 40 and Tokyo 42) for e-mail messages and use
* Significant at p< .05
** Significant at p< .01
ms: Marginally significant (.05<p<.10)
ns: Not significant (p>.10)

All Swedish respondents have access to the Internet, while ten Japanese respondent do not use the PC-based Internet, which is statistically significant (χ^2=7.97, p<.005). This is not surprising, as the Internet penetration rate in Sweden has been much higher than that of Japan. The Internet for many Japanese is the mobile Internet they have access from their mobile phones.

The respondents, on an average, spend over $65 dollars[1] every month to pay mobile communication fee. This amount includes fees for both voice communication and text messaging. Although the Japanese respondents are paying much more than the Swedish users ($71.55 vs. $56.16), the difference is not statistically significant. The mobile communication cost is positively correlated with the number of m-mail messages sent to and received from friends in both cities, but not with the number of m-mail exchanges with family. The mobile communication cost is also correlated with the number of mobile phone calls made to and received from friends (in both cities), to family (in Sweden only), and from family (in both cities).

Variance by other demographic variables—more specifically, age, gender, occupation, and household type—is discussed when Research Question 3 is answered in Discussion.

[1] The exchange rates as of July 8, 2002 (1SEK = 0.107681USD, 1JPY=0.00838783USD) were used to convert Swedish Kronor and Japanese Yen to US Dollar. (Source: http://www.xe.com/ucc/convert.cgi)

CHAPTER 5: DISCUSSION

5.1 Analysis and Interpretation

Although the sample size was too small for generalization and some highly advanced statistical manipulations, Q factor analysis, one-way ANOVA (mean comparison), crosstabulation (Chi-square), and correlation (Pearson's r) tests revealed a number of patterns of m-mail usage and other communication behavior. Q factor analysis was useful to group together similar types of subjects. Each type has a different set of attitudes toward and opinions about m-mail and other social interactions. Prior to the fieldwork, my assumptions were that these characteristics of users might in part explain varying levels of the frequency of m-mail use, m-mail content, and other aspects of communication behavior. Demographic variables were expected to be another set of factors that might be related to different communication use and attitudes. Results of my research indicate that both different types of people and different demographic groups seem to be linked to varying communication behavior, including the frequency and ratio of communication technology use as well as kinds of m-mail content they exchange with friends and family. People who do not believe that m-mail is good for developing and maintaining friendship do not send or receive many m-mail messages and send primarily practical and informational content, compared with those who believe that m-mail improves relationships and who exchange m-mail not only for practical matters but also for socializing and conveying emotional feelings. Non-believers most clearly represent the former, and Student-like, Heavy Users the latter.

5.2 Findings Related to Dimensions of the Research Questions

5.2.1 Research Question 1

The first Research Question has asked whether the nature of the relationship between two communicators is related to the users' m-mail use behavior (i.e., frequency of exchanges and message content).

RQ1. Does a mobile text messaging user exchange m-mail a) more frequently and b) with sociable content more often with the people whom the user perceives psychologically closer?

Although it is difficult to measure closeness between two individuals in any relationship, the combination of the survey and Q-sorts has revealed certain trends as to what types and demographic groups of respondents use m-mail and other communication modes in what way, including frequency of use, whom to communicate with, and subjective views of m-mail as a communication tool. It must be noted that a goal of this study is not generalization. It is not to seek causal relationships between two variables, either. Statistical manipulation is used to the extent that allows better understanding of the respondents' behavior of m-mail use and attitudes toward this medium vis-à-vis other means of interpersonal communication.

In the survey, the questions corresponding to RQ1 are #3, 4, 5, 7, 8, 16, 17, 18, and 19, while the Q-statements directly related to this RQ are #11-17 which are the statements concerning intimate content. In addition, Statements # 2 and 6 (communication frequency), 18 and 19 (interactivity), 26-32 (FtF, phone, and m-mail comparisons), and 33-35 (language) are useful to answer to RQ1.

As discussed in the Communication Use section (4.2.2), there are some differences in frequency and content of m-mail between the Stockholm and Tokyo respondents. In this section, I first give an overview of communication use by type with the aid of several tables, and then examine content of m-mail messages the respondents are exchanging. Variance of these variables between types is part of RQ3. Inclusion of Q-sorting results naturally requires explanations of differences between types. This section therefore answers part of RQ3.

5.2.1.1 Frequency of m-mail exchange

This study has found significant variance in frequency of m-mail exchanges with friends among types and demographic groups. The contrasts are rather striking. Students in the teens and 20s are generally the heaviest m-mail users. Particularly in Japan, there are extreme youth users.

In each of the following three tables, the "all" column is the mean of the Swedish, Japanese and combined sample respectively (from Table 4.17). The F and p values are associated with the means of the types only, and not with the sample-wide ("all") means. As explained in the factor analysis section and the sample size (n) row indicates, some people are not accounted for in each table.

I should mention here that although the survey asked whether and how often respondents have personal (non-business) communication with people other than their friends and family members, excluding news, commercial and SPAM sources, the volume respondents indicated was insignificant in all types of communication and therefore those are not included in the tables.

In the Japanese table (4.19), the subject with a negative loading (JP12 who is a teenage male college student) is not included in the Emotional Users mean calculations. For all of the items listed in Table 5.2, this individual's numbers are smaller than the means of the rest of the members on this group. These differences, however, are not statistically significant. In the Emotional User group, there is one person who sends and receives m-mail to/from friends less than JP12 does, two persons make less mobile phone calls to/from friends than JP12, and four subjects rarely send or receive e-mail like JP12. Besides, the sample size of the Emotional User type is only 12 excluding JP12. Perhaps because of these reasons his numbers are not statistically different from the rest for the items listed in the table. However, he is significantly different in some other items in the survey. One thing outstanding about this subject is that by the time I met him he had used the mobile phone and m-mail for only three months. His attitude toward m-mail might be still under development or perhaps he has not caught up with the high level of usage many of his friends display. To be consistent, and because there is only one subject who has a negative loading, I have decided to exclude him from Emotional Users whenever statistical calculations involve.

Table 5.1: Means of Communication Use for Entire Swedish Sample and by Swedish Type

Communication use	All SW	F1 PU	F 2 YSN	F 3 VEU	F4 HFU	FAC total	F	p<
n	40	11	9	8	4	32		
# m-mail messages sent to friends	2.61	1.47	3.35	3.38	4.25	2.82	2.78	.059
# m-mail messages received from friends	2.64	1.41	3.74	3.25	4.25	2.87	3.77	.022 *
# m-mail messages sent to family	1.20	1.16	1.17	1.03	2.00	1.24	.334	ns
# m-mail messages received from family	1.2.	1.15	1.35	1.04	1.50	1.22	.090	ns
# mobile phone calls to friends	2.26	1.43	3.04	3.25	2.50	2.43	1.74	ns
# mobile phone calls from friends	2.80	1.58	3.61	4.38	3.25	3.06	1.98	ns
# mobile phone calls to family	1.43	1.14	.73	2.00	3.00	1.47	3.84	.020 *
# mobile phone calls from family	1.72	1.17	1.24	2.50	3.25	1.78	3.74	.022 *
# phone calls to friends	1.97	1.13	2.89	2.41	2.25	2.09	1.83	ns
# phone calls from friends	1.77	1.12	2.67	1.91	1.75	1.83	1.91	ns
# phone calls to family	1.18	1.42	.79	1.38	1.25	1.21	1.01	ns
# phone calls from family	1.13	1.19	.81	1.63	1.50	1.23	1.28	ns
# e-mail messages sent to friends	3.47	2.47	6.57	4.07	2.25	3.99	.38	ns
# e-mail messages received from friends	3.58	3.02	6.78	3.09	3.00	4.09	.36	ns
# e-mail messages sent to family	.89	.81	.59	1.89	1.00	1.04	1.14	ns
# e-mail messages received from family	.89	.78	.59	1.91	1.00	1.04	1.19	ns
# years e-mail has been used	5.96	6.45	5.85	7.45	4.50	6.29	.67	ns
# years m-mail has been used	2.95	2.51	3.49	2.94	3.92	3.09	1.40	ns
# years mobile phone has been used	4.07	4.73	3.49	3.88	5.23	4.22	1.01	ns

Notes: PU=Practical Users, YSN=Young Social Networkers, VEU=Veteran E-mail Users, HFU=Heavy Female Users

ns: Not significant, * Significant at p< .05, ** Significant at p< .01

Table 5.2: Means of Communication Use for Entire Japanese Sample and by Japanese Type

Communication use	All JP	F1 NB	F 2 EU	F3 SHU	F4 RW	FAC total	F	p<
n	56	18	12+	8	7	45+		
# m-mail messages sent to friends	8.37	2.63	8.24	18.25	12.00	8.36	5.60	.003 **
# m-mail messages received from friends	8.71	2.96	8.66	18.25	12.71	8.72	5.15	.004 **
# m-mail messages sent to family	.72	.45	.89	.26	2.00	.77	5.17	.004 **
# m-mail messages received from family	.75	.58	.81	.26	2.00	.80	4.62	.007 **
# mobile phone calls to friends	1.83	.80	1.58	1.02	5.43	1.77	2.08	ns
# mobile phone calls from friends	1.96	.86	1.33	1.03	6.86	1.95	2.05	ns
# mobile phone calls to family	.67	.86	.77	.28	1.00	.75	1.39	ns
# mobile phone calls from family	.84	.89	.85	.55	1.29	.88	1.00	ns
# phone calls to friends	.54	.64	.38	.00	.43	.42	.83	ns
# phone calls from friends	.59	.64	.54	.13	.57	.51	.46	ns
# phone calls to family	.45	.45	.57	.00	.43	.40	1.59	ns
# phone calls from family	.50	.48	.75	.27	.43	.51	1.00	ns
# e-mail messages sent to friends	1.78	1.85	2.34	1.40	2.25	1.98	.38	ns
# e-mail messages received from friends	1.82	1.71	2.34	1.40	2.92	2.03	.36	ns
# e-mail messages sent to family	.19	.36	.01	.01	.42	.23	1.14	ns
# e-mail messages received from family	.19	.36	.01	.03	.42	.23	1.19	ns
# years e-mail has been used	4.03	5.68	3.71	4.13	2.29	4.39	1.47	ns
# years m-mail has been used	2.04	1.62	2.08	3.19	2.06	2.09	3.245	.032 *
# years mobile phone has been used	3.69	4.38	3.57	3.56	3.42	3.87	.46	ns

Notes: NB=Non-believers, EU=Emotional Users, SHU=Student-like, Heavy Users, RW=Reserved Writers, ns: Not significant, * Significant at p< .05, ** Significant at p< .01, +: One subject with a negative loading (JP12) is excluded from Emotional Users (F2).

Table 5.3: Means of Communication Use for Entire Sample and by Combined Type

Communication use	All	F1 RM	F 2 HVD	F3 RU	F4 TML	F 5 CIU	FAC total	F	p<
n	96	19	19	15	10	3	66		
# m-mail messages sent to friends	5.97	2.82	8.68	3.41	18.10	2.00	6.87	5.68	.001 **
# m-mail messages received from friends	6.18	2.97	8.89	3.79	18.00	2.67	7.08	5.15	.001 **
# m-mail messages sent to family	.92	.97	1.16	.52	.94	.81	.91	.74	ns
# m-mail messages received from family	.94	1.07	1.21	.65	.94	.71	.98	.59	ns
# mobile phone calls to friends	2.01	1.75	2.75	.63	1.41	2.00	1.73	3.66	.010 **
# mobile phone calls from friends	2.31	2.17	2.91	.70	1.51	1.67	1.91	3.02	.024 *
# mobile phone calls to family	.98	1.20	1.58	.63	.52	.52	1.04	2.31	.ns
# mobile phone calls from family	1.21	1.47	2.09	.73	.74	.48	1.31	4.27	.004 **
# phone calls to friends	1.13	1.53	1.84	.31	.50	2.05	1.20	3.38	.014 *
# phone calls from friends	1.08	1.53	1.63	.30	.50	2.38	1.15	4.42	.003 **
# phone calls to family	.75	1.06	.77	.39	.21	1.67	.72	4.16	.005 **
# phone calls from family	.76	1.06	.94	.48	.21	.67	.74	2.53	.049 *
# e-mail messages sent to friends	2.60	4.52	1.99	1.23	2.16	2.00	2.70	.52	ns
# e-mail messages received from friends	2.68	4.89	1.94	1.22	2.18	2.50	2.82	.67	ns
# e-mail messages sent to family	.53	.83	.51	.12	.21	.07	.48	1.07	ns
# e-mail messages received from family	.53	.82	.52	.20	.22	.07	.50	.86	ns
# years e-mail has been used	4.95	6.20	4.81	5.53	3.24	4.00	5.18	.94	ns
# years m-mail has been used	2.41	2.39	2.64	1.75	2.73	1.25	2.31	1.81	ns
# years mobile phone has been used	3.84	3.87	3.79	3.61	3.03	2.50	3.60	.50	ns

Notes: RM=The Realistic Majority, HVD=Heavy Voice & Data Users, RU=Reluctant Users, TML=Text-Messaging Lovers, CIU=Confident Infrequent Users,
ns: Not significant, * Significant at p< .05, ** Significant at p< .01

The most notable observation is the fact that variance of the first two variables—sending and receiving m-mail to/from friends—is statistically significant in all three data sets, except that the first variable (sending m-mail to friends) in the Swedish sample is marginally significant ($p<.059$). This indicates that frequency of m-mail exchanges with friends may in part explain how these types differ one another. These two variables also have significant variance in the inter-city comparison (Table 4.17). In the Japanese table (4.19), the variables of sending and receiving m-mail to/from family have also significant variance, but the respondents exchange m-mail messages with family much less frequently as they do with friends. In all data sets, for any group, the number of m-mail messages sent to or received from family is less than two for each direction.

Interestingly, in the Swedish and Japanese tables (5.1 and 5.2), only a few variables are statistically significant. When the data are combined (Table 5.3), more variables are identified statistically significant. It is probably because Japanese subjects dominate Reluctant Users and Text-Messaging Lovers and because Japanese on average make far fewer phone calls on both the fixed and mobile phone than Swedish counterparts (Table 4.17).

As discussed in the previous section, part of communication behavior of each type can be estimated by examining how often they use m-mail versus other kinds of communication methods, although frequency does not tell why it is so. It would be useful to examine each table and compare three samples one another.

In the Swedish sample, Heavy Female Users send and receive m-mail messages to/from friends three times more than Practical Users do. The other two types send and receive about one message less than Heavy Female Users do. Variance of these variables is statistically significant. Also significant is the number of mobile phone calls to/from family. Again, Heavy Female Users have the most frequent communication with family over the mobile phone. As discussed before, this female-only type represents the heaviest m-mail communicators in the Swedish sample. They feel comfortable typing on the keypad, use proper grammar and spelling in m-mail, and

check the mobile phone screen all the time for new message arrival, while Practical Users would rather talk than exchange m-mail. When Practical Users must send something via m-mail, content is most likely practical and informational because they perceive they cannot express themselves well in m-mail. Thus, it appears that not only frequency of m-mail but also content of m-mail is different between these types.

Young Social Networkers and Veteran E-mail Users fall between Practical Users and Heavy Female Users in terms of frequency of m-mail as well as mobile phone calls. Concerning the use of the fixed phone and e-mail, Young Social Networkers and Veteran E-mail Users have generally higher figures than the others. Young Social Networkers and Veteran E-mail Users are similar to each other in frequency of communication use. However, when their demographics and Q-sort data are compared, these two types are also contrasting. While the subjects in Young Social Networkers are younger and frequently communicating with their friends by using all communication tools, Veteran E-mail Users are more family-oriented.

The Japanese sample shows stronger contrasts among the four types in their use of m-mail than the Swedish sample. Student-like, Heavy Users send and receive to/from friends seven times as many as Non-believers. Student-like, Heavy Users, Emotional Users, and Reserved Writers are in fact communicating with friends via m-mail more often than any of the Swedish types. Non-believers do not believe in m-mail. Like Practical Users in the Swedish sample, Non-believers want to talk rather than to send m-mail. When Non-believers send m-mail, content is usually something practical, not emotional. Student-like, Heavy Users, in contrast, loves to use m-mail to communicate with friends, although they rarely communicate with family via m-mail. Like Swedish Young Social Networkers, Japanese Student-like, Heavy Users consists of younger people. But unlike Young Social Networkers, the latter does not use the other communication tools so much. M-mail is the main communication method for Student-like, Heavy Users. Emotional Users, and Reserved Writers also use m-mail a lot because the former type likes to disclose their personal news—good and bad--and the latter tends to avoid talking FtF or over the telephone. Student-like, Heavy Users,

Emotional Users, and Reserved Writers all seem to like to belong to social groups. Unlike Non-believers, these three types send emotional m-mail.

Interestingly, unlike the Swedish sample, all four Japanese types, including Non-believers, use m-mail more often than the mobile (voice) phone, the fixed phone, or e-mail each day to communicate with friends. In Sweden, Practical Users, Young Social Networkers, and Veteran E-mail Users send e-mail more often than they do m-mail, and these three types place and receive mobile phone calls as often as m-mail. In this regard, use of communication tools by the Japanese sample is skewed, while the Swedish sample shows balanced use of such tools.

All combined types, except Confident Infrequent Users, inherited their respective dominant components (i.e., Swedish and/or Japanese types or part of them) for the trends of their m-mail usage. Confident Infrequent Users do not belong to any of the Swedish or Japanese types and they appear only in the combined sample. Confident Infrequent Users (three females) use m-mail, the mobile phone, the fixed phone and e-mail equally to communicate with friends. They are infrequent communicators of m-mail, and even so, they use m-mail slightly more often than Swedish Practical Users on average. This is because one of the Japanese members of the Confident Infrequent Users type sends four messages to her friends and receives five from her friends a day. Heavy Voice & Data Users, Reluctant Users, and Text-Messaging Lovers, on the other hand, use m-mail more frequently than the other communication tools. The Realistic Majority use e-mail most often. The dominant component of Text-Messaging Lovers is Japanese Student-like, Heavy Users. The latter type represents the heaviest m-mail users of all types. Therefore, Text-Messaging Lovers show the highest level of m-mail use among the five combined types. The main body of The Realistic Majority is from Swedish Practical Users, who are instrumental m-mail users, and therefore has lower m-mail use figures. Heavy Voice & Data Users are mainly from Veteran E-mail Users, Heavy Female Users, and Emotional Users, and show higher numbers of m-mail use than the other combined types except the Text-Messaging Lovers type. Reluctant Users are mostly from Non-believers, but additional

subjects who have been added to this type contribute to a higher level of m-mail use than the Non-believers type alone.

Since some respondents do not belong to any types, it is necessary to examine if those people are different from factor-loaded subjects in any communication behavior. The unloaded respondents in the Swedish and Japanese samples have no significant differences in frequency of m-mail, the mobile phone, the fixed telephone, m-mail and FtF interactions from the loaded individuals. In the combined sample, only differences in the frequency items between the loaded and unloaded respondents are a) the loaded subjects send at least one m-mail message a day to more people (mean=1.93, $F=4.695$, $p<.033$), and b) the loaded people meet more family members (mean=.49), who live outside their homes, 5-7 days a week than the unloaded respondents ($F=4.960$, $p<.028$). Although these variables have significant variance, volume in each of these variables is relatively small. For many respondents, the number of friends or family members they send more than one message a day is zero.

The number of different people the respondents communicate with via m-mail should almost coincide with frequency of m-mail use, but not exactly proportionally because some people may communicate with a few friends frequently, while some people may communicate with a large number of people but once for a while with each. Table 5.4 indicates breadth of interpersonal interactions.

Table 5.4: Number of Different People Communicating With

Item	By	n	Mean	Min.	Max.	F	p<
To how many different people do you send more than 1 m-mail message a day?	All SW	40	1.55	0	6		
	PU	11	.82	0	3		
	YSN	9	1.22	0	3		
	VEU	8	2.00	1	5		
	HFU	4	3.25	0	6		
	Total FAC	32	1.53	0	6	3.34	.033*
From how many different people do you receive more than 1 m-mail message a day?	All SW	40	1.35	0	6		
	PU	11	.55	0	2		
	YSN	9	1.33	0	3		
	VEU	8	1.75	0	3		
	HFU	4	3.00	0	6		
	Total FAC	32	1.38	0	6	3.89	.019*
To how many different people do you send more than 1 m-mail message a day?	All JP	55	1.75	0	10		
	NB	18	1.06	0	6		
	EU	12	2.79	0	10		
	SHU	8	2.13	0	6		
	RW	7	2.14	1	3		
	Total FAC	45	1.88	0	10	1.99	ns
From how many different people do you receive more than 1 m-mail message a day?	All JP	55	1.75	0	10		
	NB	18	.83	0	5		
	EU	12	2.75	0	10		
	SHU	8	3.25	0	10		
	RW	7	2.51	1	5		
	Total FAC	45	2.04	0	10	3.06	.039*

(To be continued to the next page)

Table 5.4 continued

Item	By	n	Mean	Min.	Max.	F	p<
To how many different people do you send more than 1 m-mail message a day?	All	95	1.67	0	10		
	RM	19	1.68	0	10		
	HVD	18	2.81	0	6		
	RU	16	.94	0	6		
	TML	10	2.40	1	6		
	CIU	3	1.33	0	3		
	Total FAC	66	1.90	0	10	2.40	.060ms
From how many different people do you receive more than 1 m-mail message a day?	All	95	1.67	0	10		
	RM	19	1.63	0	10		
	HVD	18	2.47	0	6		
	RU	16	.69	0	5		
	TML	10	2.50	1	6		
	CIU	3	1.33	0	3		
	Total FAC	66	1.75	0	10	2.48	.053ms

Notes:
PU=Practical Users, YSN=Young Social Networkers, VEU=Veteran E-mail Users, HFU=Heavy Female Users, NB=Non-believers, EU=Emotional Users, SHU=Student-like, Heavy Users, RW=Reserved Writers, RM=The Realistic Majority, HVD=Heavy Voice & Data Users, RU=Reluctant Users, TML=Text-Messaging Lovers, CIU=Confident Infrequent Users
* Significant at p<.05, ** Significant at p<.01, ms: Marginally significant

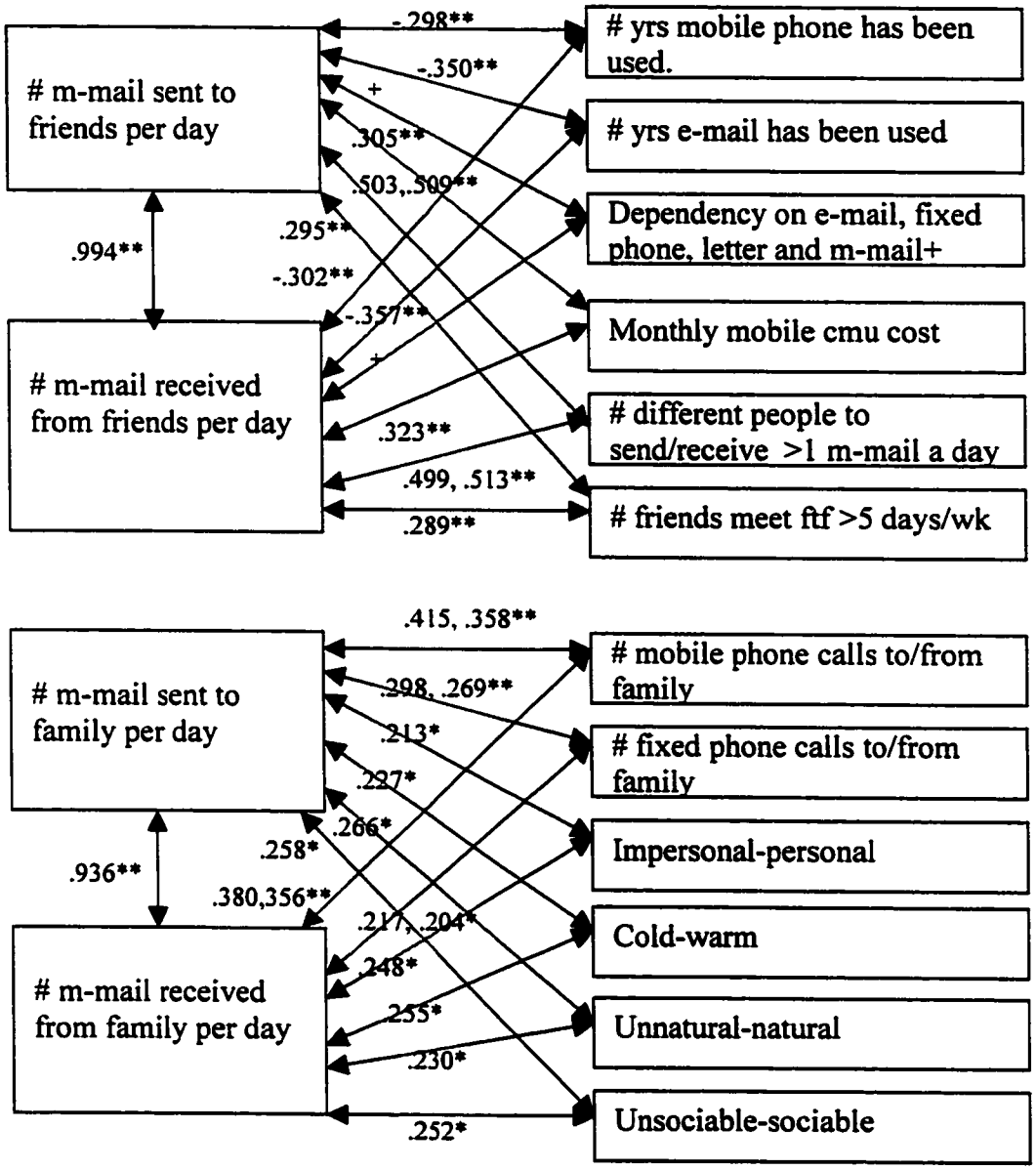
As shown in Table 5.4, the Japanese respondents send more than one m-mail message up to ten people a day, while the Swedish counterparts send at least one m-mail message up to six people a day. Heavy Female Users seems to maintain frequent m-mail exchange with the largest number of people. The range of the number of people from whom they receive one message or more a day is the same between the Swedish and Japanese samples. Some respondents do not communicate with anybody so often. Thirteen (32.5%) of 40 Swedish respondents and 19 (34.5%) of 55 Japanese

respondents (one answered "Don't know") have said that no individual sends them more than one m-mail on a daily basis. Eleven (27.5%) Swedes and 19 (34.5%) Japanese do not send more than one message each day to the same person. Of the entire sample (n=95), 55.8% receive more than one message a day from one, two, or three people, and 59% send more than one message a day to one, two, or three people. Only 10.5% of the entire respondents have four or more friends and family members who send them more than one message, and 9.5% respondents send at least one message to each of four or more people every day.

In the Swedish sample, although Young Social Networkers and Veteran E-mail Users send and receive similar number of m-mail messages (Table 5.1), Table 5.4 above indicates that Young Social Networkers may be communicating with a smaller number of friends but more exchanges with each friend than Veteran E-mail Users Young Social Networkers are younger and eager to keep in contact with friends than the subjects on the latter group. Similarly, among Emotional Users, Student-like, Heavy Users, and Reserved Writers in Japan, Emotional Users may be communicating with a larger number of people but a smaller number of messages per person, compared with the other two types. Student-like, Heavy Users may be communicating with a small number of people but very often with each.

The number of friends the respondents meet FtF frequently (more than five days a week) did not reveal any statistically significant variance across the cities and types. The number of family members respondents meet FtF more than five days a week, however, is greater in Sweden than in Tokyo (Sweden mean=.60, Japan mean=.18, overall mean=.35, $F=5.74$, $p<.019$). This is likely because less Japanese than Swedes have family members living outside their homes, so that many Japanese do not have to make opportunities to meet family members in separate households.

Correlations between variables are also useful to see how variables are linked. Pearson's correlation coefficients indicate that frequency of m-mail messages sent to and received from friends has a group of variables correlated with it, while m-mail exchange with family has a different set of variables correlated with it, as illustrated below:



Note:

* Significant at <.05, ** Significant at <.01

\+ Magnitude of correlation varies:

m-mail dependency	Send=.471**	Receive=.458**
e-mail dependency	Send=-.325**	Receive=-.336
fixed phone dependency	Send=-.286**	Receive=-.282**
letter dependency	Send=.279**	Receive=.265**

Figure 5.1: Correlations between M-mail Frequency Variables and Others

As shown in Figure 5.1 above, frequency of m-mail exchange with friends is not correlated with frequency of m-mail exchange with family. Tables 5.1, 5.2 and 5.3 show that respondents in both cities and all types, on average, exchange m-mail with friends more than they do with family. There are significant differences among different demographic groups. Younger m-mail users exchange messages with their friends all the time, while they rarely exchange m-mail with their family members. Most younger m-mail users communicate with friends but only occasionally with family. One of the reasons for this trend is likely that their parents have mobile phones but do not use text messaging. Another reason is probably that for young students, school life, not family, is the center of their social network and for them, belonging to the network is important. And yet another reason might be that all high school students and many college students live with their parents and siblings and see and talk to each other every day so that they may not feel additional m-mail communication necessary. Older users, on the other hand, tend to exchange m-mail mainly with spouse and children because they have few same-age friends with whom they could exchange m-mail.

5.2.1.2 Length of use

As the polarity of the coefficients indicates, length of mobile phone use, length of e-mail use, and dependency on e-mail and the fixed phone are negatively correlated. Unlike e-mail that was initially adopted by male professionals, m-mail is particularly popular among school children and youth. Because of this reason, the longer respondents have used the mobile phone and e-mail, the less they send and receive m-mail to/from friends. Younger people have owned the mobile phone for shorter periods of time, but they send more than those who are in older generations. Variance of m-mail use by age is further discussed in the RQ3 results section. It is also understandable that those who depend on e-mail and the fixed phone more tend to use m-mail less, as one of the dimensions of dependency is frequency of use.

5.2.1.3 Content

Content of m-mail cannot be directly measured because a researcher cannot easily read someone's m-mail messages. Unlike e-mail, m-mail cannot be printed out. M-mail messages are saved in the mobile phone memory for a short period of time, as memory size of the handset is limited. Also, because m-mail is short in length, fast and interactive, it is extremely difficult for a researcher to follow two-way dialogues between m-mail communicators, unless the researcher himself/herself participate in the interactions. In a study of adolescents' mobile culture in Finland, Kasesniemi and Rautiainen (2002) collected SMS messages from teenage informants. However, how teenagers collected messages varied from one participant to another. Some wrote down every message they sent and received, others collected purposively selected messages. But all the collected data were re-generated out of the informants' own memory. In this study, because of difficulty in collecting actual m-mail messages, I have decided to rely on respondents' self report on what kinds of m-mail are exchanged under what circumstances through the survey and Q-sorts.

Some respondents, such as those who belong to Practical Users, Non-believers, Reluctant Users, and Confident Infrequent Users, use m-mail mainly to exchange practical information in order to organize their day-to-day life (e.g., to set up meetings, to inform that they will be late, and to report where they are). The majority of respondents, however, seems to agree that m-mail is not only for practical purposes but also for maintaining relationships. They do send emotional messages in addition to instrumental ones. Here is a review of the factor scores of two statements:

S#16: SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings.

SW	PU	YSN	VEU	HFU	
	0	-2	-4	-4	
JP	NB	EU	SHU	RW	
	0	-4	-2	-3	
COM	RM	HVD	RU	TML	CIU
	-1	-4	0	-2	2

S#17: I send instrumental and informational SMS messages more often than social and emotional messages.

SW	PU	YSN	VEU	HFU	
	3	-2	-1	0	
JP	NB	EU	SHU	RW	
	2	-4	-2	-3	
COM	RM	HVD	RU	TML	CIU
	0	-2	3	-2	3

The Confident Infrequent Users type has the factor score 2 (z score=0.67) for the statement #16 because one member (Swedish female) has chosen this statement to be a 4. The other two members of this type (two Japanese females) have both chosen –1s. The Reluctant User type is only other group that has yielded a positive normalized score for the statement #16 (z score=0.14). Ten of 16 members of this type chose positive numbers of zeros, but two individuals strongly disagreed (-3s), and thus has the factor score 0.

The members in Practical Users, Non-believers, Reluctant Users, and Confident Infrequent Users show more consistent Q-sorts for the statement #17 than those for #16. Of 11 Practical Users, only one subject has placed this statement under –1, two have chosen 0s, and the rest have placed it at 2, 3, and 4, resulting in the highest normalized score (z=1.36) for this statement among the types. Of 18 Non-belivers, only two subjects have chosen negative positions for #17, three Reluctant Users are negative, and three Confident Infrequent Users have placed this statement at 4, 2, and 0. With a few exceptions, these four types consist of people who mainly send instrumental, informational, and unemotional messages.

What kind of emotional messages people send is hinted in my 2001 interview research. A Swedish female in the 30s described her m-mail exchanges with her brother, "More practical ones, and some loving ones…'What do you do?' 'I miss you,' 'Thinking about you…' that kind of things." A Swedish male interviewee in the 30s

said, "With my girlfriend, like short messages, like when she is having an exam, wish her luck." A Japanese female college student mentioned, "One-thirds of mails I send are something emotional. I use keitai-mail for what I cannot express well by face-to-face, including everyday trivial matters." Most of my interviewees, however, said something like a Japanese male in the 30s described, "A half of keitai-mails I send are for making meeting arrangements, although I add a greeting like, 'Are you well?' or 'How have you been?' The rest are trivial miscellaneous matters about baseball games, TV programs, books recently read, good restaurants, and so on....Sensitive and emotional communication is done face-to-face or over the phone."

If one sends only practical messages to friends and family, the number of messages, compared with more socially active m-mail communicators, would be smaller. How many messages does a student have to send to his classmate asking about a class assignment? It would be once a week or maybe less. But if a student wants to say something like, "Good morning. I was worried about you, as you missed the English class yesterday. Are you feeling OK?" and "I didn't do my math exam well today. I am depressed. How about you? Good night and see you tomorrow in class" to a few of her close friends daily, the number of messages she sends each day may easily exceed ten.

It is interesting to note that all types in all three data sets have rated the Q-statement #13, "A SMS message from my close friend can please or entertain me even when the content is trivial," highly positive. The factor score of this statement was 4 to all except Practical Users and Reluctant Users, which rated 3. Most people do not mind receiving m-mail from friends, regardless of content, assuming that such messages are not hostile in nature.

In the survey and Q-statements, I deliberately did not specify what the word "friends" means. No respondents asked for the definition of this term during the survey and Q-sorting sessions. Judging from their responses, it appears that friends are the ones who are close psychologically or emotionally. And respondents have amicable relationships with their friends. That is why some people disclose their personal feelings to friends. Friends are, however, not necessarily in the same geographical area and

frequent FtF meetings may not be feasible due to the physical distance. Of 96 respondents, 70% have said some m-mail friends are at the same workplace or school and 20% have said they are not communicating with same-location colleagues by m-mail. Again 70% of the entire respondents have said that some m-mail friends are near their home, school or workplace but some are far away, and 13% claim that all of the people they communicate with by m-mail are in distant locations. Students meet their m-mail friends often because they communicate with friends at the same school via m-mail. In my interview research, Swedish teenagers said that they meet their m-mail friends "almost everyday," "every other day," and "twice a week." Japanese teenagers typically said, " I exchange keitai-mail more often with my friends I see and talk with more frequently." Most interviewees in the 30s and 40s in both Stockholm and Tokyo said, "I see some [m-mail friends] often and I don't see some often."

Some respondents intimately communicate with friends and family by m-mail. Is m-mail perceived to be a tool to communicate sensitive matters between people psychologically close to each other? Do people send something via m-mail because they could not say the same thing on the phone or FtF? Respondents' answers to Q16, "Do you send SMS with content you cannot say on the phone?" in the survey indicate that 61% (51 of 84 answered) claim that they send m-mail to friends sometimes or often when they feel it would be difficult or awkward to say something over the phone. To family members, 24% (10 of 42) say they use m-mail for such occasions. Interestingly, this communication strategy is used in both Sweden and Japan almost equally. Variance of these items by city and other demographic variables (age, gender, occupation and household) as well as by type is not statistically significant. It may be in part because a user wants to avoid embarrassment when he/she has no idea how the other would react, such as when asking for a date, and because the user wants to control the situation against the receiver's anticipated reaction to the information communicated to that person, such as when informing the mother of coming home late. Some users, as indicated in Q-sorts, think that they are not good at talking and would rather communicate by text most of the time.

During my 2001 interview research, a male interviewee in Stockholm said, "The good thing is that sometimes it is easier to send SMS than to phone someone. You can sit here and think of what you can say and if it sounds good you can send it. But on the phone, you don't know what to say." A female college student in Tokyo told me, "...I also send [keitai-]mails to boys. If they return my mail, I am happy. I can make friends with them by mail. It is awkward to ask 'what are you doing now?' on the phone, but I can ask such a question by mail."

Some people do share content of messages with others and even collaborate with others to create messages. Of 96 respondents, 76 (79%) share m-mail content in varying degrees with people around them. This kind of real-time, direct sharing does not occur often with e-mail. An e-mail message can be forwarded to someone other than the sender, but showing an incoming e-mail on the PC screen to someone sitting in the next office is rare. Sharing m-mail content contradicts with the traditional notion of the mobile phone as a private communication tool. A mail is delivered to the recipient's m-mail box and nobody else is supposed to open it. However, the person received the message might be sharing it with his/her friends or family upon receipt or after saving it in the handset memory. A private dialogue, so the sender thought, may become public knowledge easily. In addition, 29 (31%) of 93 (3 don't know's) collaborate from time to time. Variance of these items is not statistically significant when they are examined by city, gender, age, occupation, and type. Only age is marginally significant for the collaboration (χ^2=20.14, p<.065). Younger people seem to collaborate more than older generations in general.

Language and wording, as part of content, used in m-mail was another set of items investigated through the survey and Q-sorting. Ten respondents (two Swedes and eight Japanese) have reported that they do not shorten words, phrases or sentences when they type m-mail on the keypad. The rest do. A few examples from my interview research include a graduate student in Sweden saying, "...when I send SMS, they are shortened, verbs taken out, letters are made shorter...and of course when I'm sending an e-mail it's more correct." A Japanese male in the 30s has said, " I would write, for example, 'no res' instead of 'no response' and use two-character words to mean a street

name or a company name that only the receiver and I could understand what it is." Comparing m-mail wording with e-mail wording, 20 (48%) of 42 Japanese and 9 (23%) of 39 Swedish e-mail users have claimed that they are the same, while 22 (52%) Japanese and 30 (77%) Swedes have said they use different wording. Variance between the cities is statistically significant (χ^2=7.89, p<.019). The difference mainly owes to the fact that m-mail wording of a large majority of the Japanese female respondents (16 of 21) is the same as m-mail wording. Japanese females seem to use the same e-mail language in their m-mail even though m-mail is usually considered a more casual communication tool than e-mail.

The language used in m-mail is reportedly cryptic and telegraphic in literature (for example, Kopomaa, 2000). Surprisingly, 19 Japanese (16 of which are in their teens and 20s) and two Swedes say that their m-mail language has started to get used in their FtF conversations as well. It is not clear whether this inter-city difference, which is statistically significant (χ^2=16.31, p<.000), is because the Japanese spoken language is more flexible and modifiable than the Swedish language.

A contradictory result has been revealed through Q7 d) as to whether the respondents would use words and phrases that have special meanings for only the communicators. In Sweden, 25 (63%) of 40 say yes to this question, while a majority (34 or 62% of 55) of the Japanese respondents say no. This inter-city contrast is also statistically significant (χ^2=5.48, p<.016). The Japanese types have marginally significant variance for this item (χ^2=7.67, p<.053). A large majority of members in the Non-believers and Emotional Users types do not use words or phrases with special meanings, while a majority of members in the Student-like, Heavy Users and Reserved Writers types exchange words or phrases with special meanings between communicators.

Length of each m-mail message is limited to160 characters for those who use GSM-based mobile networks, including the Swedes, and to 250 for those who subscribe to a regular m-mail service in Japan. In Sweden, 18 (46%) respondents wish they could send more than 160 characters per message all the time or often, 16 (41%) hope they could do that sometimes or occasionally, while only 5 (13%) do not wish for a longer

message at all. In Japan, the trend is almost opposite to Sweden. Ten (18%) want to send longer messages all the time or often, 29 (53%) feel like to send longer messages sometimes or occasionally, and 16 (29%) do not need to send longer messages. These differences are statistically significant (χ^2=9.58, p<.048). One Japanese subject subscribes to a special m-mail service with which he can send m-mail with unlimited length. Another Japanese (female) explains that her m-mail service allows up to 500 characters, and yet she occasionally wishes she could send longer messages. It appears that Japanese male respondents tend not to have this desire, compared with the rest of the sample, but this gender difference is only marginally significant (p<.077). Variance across the Japanese types is marginally significant (p<.073), with Non-believers having the largest proportion of subjects who have no desire for sending longer messages. In contrast, variance across the combined types is significant (χ^2=38.22, p<.001), where the Reluctant Users type has the largest proportion of subjects who would not send longer messages, while a majority of the subjects belonging to the Text-Messaging Lovers, Heavy Voice & Data Users, and The Realistic Majority types would like to send longer messages in varying degrees.

In examining friendship, the survey has asked not only about off-line friends but also about virtual friends (Q8 a-c). A virtual friend in the survey is defined as a friend whom a respondent communicates with only online and has never met FtF or talked on the phone. In the Swedish sample, at the time of the survey, only three respondents had virtual friends on m-mail, while 11 were exchanging e-mail with virtual friends. The three individuals, all teenagers, one male and two females, who had m-mail virtual friends also had virtual friends on e-mail. In Japan, on the other hand, only two teenagers (one male and one female) had virtual friends on m-mail, and one male in his 40s had virtual friends on e-mail. Four Swedes and six Japanese had m-mail virtual friends previously, but they have eventually met these friends in person or simply stopped communicating. Similarly, 11 Swedes and two Japanese had e-mail virtual friends previously. Only the latter (virtual friends on e-mail) is statistically significant (χ^2=34.32, p<.000). One reason for this inter-city difference is likely that the Japanese use the Internet much less than the Swedes. Another reason may be that traditionally

the Japanese tend not to talk to strangers and their actual-life behavior is reflected on their online culture.

5.2.2 Research Question 2

The second Research Question involves consequences of m-mail use, in terms of its contribution, or lack of it, to deepening relationships, perceived by the user. My interest here is whether respondents would use m-mail to initiate, develop, maintain and end relationships and whether they perceive m-mail helps them to maintain or even improve actual-life relationships.

> **RQ2.** How are the mobile text messaging users' social networks or interpersonal relationships changed, if any, from the users' viewpoints, since they started using this medium? Do the users perceive if the medium helps them to enhance interpersonal relationships or contributes to superficial relationships?

In the survey, Questions #9, 10, 11, and 12 are directly related to this RQ. Q-statements useful to answer this relationship RQ are #6, 7, 8, 9, 10 (socializing activities), 26, 27, and 30 (modality). In the first part of this section, I examine perceived impact of m-mail on relationships with friends and then discuss relationships with family, as respondents' responses to the former seem to be different from the latter.

5.2.2.1 Friendship

Whether m-mail users think m-mail helps them to develop and maintain good relationships is an interesting area this study has touched upon. More research is required in this area. Certain trends have surfaced in this study, though. Some people think m-mail can contribute to relationship maintenance and some people do not. The answer to the question, whether they think their relationships with existing friends have changed because of m-mail, varies significantly between students and non-students.

A straightforward question has asked respondents whether they think their relationships with existing friends have changed because of m-mail since they started using m-mail (Q 10 a). Interestingly enough, variance by city, gender, and age for this item is not statistically significant, but it is significant by occupation (χ^2=31.45,

$p<.026$). It appears whether the person is student or not makes a difference. While 23 (50%) of 46 high school, college, and graduate students feel their relationships with friends have been improved or deepened or become positive and 17 (37%) recognize no change, 12 (29%) of 42 non-students report improvement and 28 (67%) no change. Only two Swedish female subjects claim their relationships with friends have been worsened or become negative or superficial. But they are one high school student and one graduate student. The fact that many students feel change indicates that students use m-mail primarily for socializing within their rather contained social space and therefore are more sensitive about their daily communication with friends and change in relationship than people who have work, family and wider-scope social interactions. This item across types does not produce any statistically significant variance, except that variance by combined type shows a marginally significant ($p<.082$) result. Heavy Voice & Data Users seem to be most optimistic, and 10 of 16 members of this type think their relationships with friends have improved, while the Reluctant Users type has the largest proportion (10 of 14) of subjects who claim no change.

Interviewees in my 2001 interview research also had different opinions about m-mail's role in maintaining friendship. For example, a Swedish female high school student said, "It does make it more social...I mean setting up meetings and things, but it's not like you get closer friends that's because you send SMS to each other." A Swedish male in the 30s said, "...not a lot [impact] on friendship. Not that kind of communication. Communication is important but not frequency, not short messages used in SMS." However, a Japanese male in the 30s said, "Between close friends, keitai-mail deepens the relationship. Mail provides direct, one-to-one communication. Sometimes, keitai-mail could let two not-so-close friends deepen the relationship. When the other end does not answer a telephone call, I won't call him again, but [if I send him a mail,] he would return my mail sooner or later."

The Q-statement #9, SMS improves my relationships with friends, is asking fundamentally the same thing as Q10 a) in the survey, although the latter asks one's experience and S#9 asks about an attitude. However, in Q-sorts, each statement is placed according to respondents' perceived importance relative to the other statements.

Also, during the Q-sort process, respondents may reflect not only their own experiences but also their general observations of others in their placement of Q statements. Therefore, survey results may not perfectly match Q results. The factor scores of this Q-statement for each data set are as follows:

S#9: SMS improves my relationships with friends.

SW	PU	YSN	VEU	HFU	
	0	2	2	0	
JP	NB	EU	SHU	RW	
	-1	2	4	3	
COM	RM	HVD	RU	TML	CIU
	0	3	-1	4	-1

Non-believers have the most negative end of normalized score, -0.72, while Student-like, Heavy Users have the highest normalized score, 1.51, among all types. Examining the actual points on the 9-point scale the Japanese respondents selected, only one subject in the Non-believers type has chosen this statement to be a 1, 8 have chosen 0s and the rest range from –4 to –1. In contrast, none of Student-like, Heavy Users and Reserved Writers has chosen a negative point and all range from 0 to 4. None of the subjects who do not belong to any Japanese types has chosen –2 and below. The Non-believer type, thus, represents a group that is most negative about the idea of m-mail being utilized for relationship maintenance. In the Swedish sample, only one has chosen a –3, two –2s, four –1s, but the rest have chosen somewhere between 0 and 4. In fact 28 (70%) of 40 Swedish respondents have placed this statement at 0, 1, or 2, resulting the normalized scores for four types between 0.02 and 0.96—mildly positive. A majority of the Reluctant Users type is from Non-believers, and therefore the factor score of Reluctant Users for this statement is also negative.

The next question, Q10 b), in the survey has asked whether respondents have made friends with someone through m-mail. This item in fact has yielded more variance than any other items related to RQ2. Variance for this item by gender, age,

occupation, household (i.e., the other members in the same household), and type is all statistically significant. A Swedish female interviewee in the early 20s explained to me how m-mail worked for her: "I've met him once...and communicate to fancy...so we get to know each other via SMS.... It's much easier." Although significance by demographic variables is the topic of RQ3, I describe demographic variance in this sub-section to maximize effectiveness and to minimize overlap. More female respondents (28 or 62% of 45) than male respondents (18 or 35% of 51) have developed new friendship through m-mail (χ^2=6.95, p<.014). The younger, the more subjects have made friends with someone through m-mail (χ^2=15.04, p<.005). In the teens, 22 (73%) of 30 have made new friends. In the 20s, 13 (48%) of 27, in the 30s, 6 (38%) of 16, in the 40s, 2 (17%) of 12, and in the 50s, 3 (27%) of 11 have made new friends respectively via m-mail. By occupation (χ^2=18.44, p<.010), high school (15 or 75% of 20) and college students (17 or 63% of 27) are the ones who actively use m-mail for relationship development, while full-time employees (10 or 29% of 35) and housewives (1 of 6) are at the opposite end. By household (χ^2=19.16, p<.008), those who live with spouse or spouse and child(ren) are the demographic groups who tend not to develop friendship through m-mail (5 or 18% of 28), while younger people who live with parents and siblings develop friendship most actively through this medium (15 or 79% of 19). Those who live alone are rather divided. Of 32 subjects who live alone, 18 have answered yes and 14 no to this question. The patterns of variance by demographics are more apparent in the Japanese sample than the Swedish sample, particularly by age, occupation, and household.

Developing new friendship is related to subjects' perceptions as to whether their relationships with existing friends have improved (χ^2=12.51, p<.006). Of 45 respondents who have not made friends by m-mail, 31 (69%) report no change in their relationships with friends, while 23 (53%) of 43 subjects who have made new friends by m-mail think their relationships with friends have improved and 14 (33%) see no change. This tendency is particularly strong in the Japanese sample. Of 25 subjects who have made friends, 17 (68%) also agree that their existing relationships have

improved, and 20 (71%) of 28 subjects who have never made friends do not think their relationships with friends have changed (χ^2=10.29, p<.006).

Variance of the new friendship item is also statistically significant across the Japanese types (χ^2=14.27, p<.003) and the combined types (χ^2=18.37, p<.001). Not surprisingly, most of Non-believers (15 of 18) and Reluctant Users (15 of 16), as well as all three of Confident Infrequent Users say they have never made friends with anyone via m-mail.

A third question on Q10 is whether respondents have ended relationships via m-mail. It may be more difficult to say good-bye to someone face-to-face but most people do that in this kind of situation because they think only sending a short parting note, such as "I don't want to see you again," is rude and ethically bad. A Swedish female in the 20s told me during my interview with her, "It was him who started. I don't like to stop a relationship by SMS, but he started it and we finished it on the mobile phone. But I don't like that. I'd rather talk on the phone or meet face-to-face. I was very angry. But it was not a good relationship. So, it didn't matter so much."

Of 16 subjects who have reported yes to Q10, 13 are Japanese. Variance by city is marginally significant (χ^2=4.11, p<.053). The age groups of these 16 subjects are 9 in the teens, 6 in the 20s, and 1 in the 30s. Variance by age is significant (χ^2=11.08, p<.026). Variance by household is also significant (χ^2=16.15, p<.024). None of the subjects who live with spouse, spouse and child(ren), or child(ren) has used m-mail to end a relationship, while 16 subjects who have used m-mail to end relationships live either alone or with parents, parents and siblings, or parents, siblings, and a grandmother. By type, variance is only significant across the Japanese types (χ^2=8.14, p<.043). Only 1 of 17 Non-believers has ended relationships by m-mail, while a half (6 of 12) of Emotional Users have done so. The latter type has, as described in the type characteristics section, high-level of self-disclosure. My questionnaire did not ask what kinds of relationships were ended by m-mail and why some respondents used m-mail instead of talking FtF or over the phone. I did not anticipate so many respondents to end relationships by m-mail.

When the ended relationship and new friendship items are cross-tabulated, it is clear that the largest number is in the no-no grid. Of 94 respondents, 45 (48%) have not made friends and have not ended any relationships by m-mail. Twelve (13%) have used m-mail for both purposes. While 33 (35%) have made friends but not ended relationships, 4 (4%) have ended relationships but not made new friends by m-mail.

Change in relationships may be able to indirectly observe from the perspective of change in frequency and time spent for FtF interactions (Q9 a) and for phone conversations (Q9 b). The former has shown no significant variance by any demographic variables perhaps because a large majority (62 of 87) has not changed their FtF interaction time and frequency with friends. This item is only marginally significant across the Japanese types (χ^2=20.77, p<.054). Frequency and length of time for FtF interactions with friends have not changed for most Non-believers (15 of 17) and Student-like, Heavy Users (6 of 8), while 4 of 11 Emotional Users and 2 of 7 Reserved Writers have answered the same.

More subjects say, however, that frequency and time spent for phone conversations with friends have changed because of m-mail. Of 94, 46 (49%) report a decrease, 4 (4%) an increase, 13 (14%) mixed (i.e., increased with some and decreased with some), and 30 (32%) no change. Variance for this item is statistically significant by city, occupation, and household as well as across the Swedish and Japanese types. In a inter-city comparison (χ^2=13.24, p<.010), a large majority in both cities--23 of 38 in Stockholm and 23 of 56 in Tokyo—has decreased phone conversations with friends, and the same proportion of respondents (12 in Stockholm and 18 in Tokyo, 23% each) has claimed no change, but 13 Japanese respondents have increased with some friends and decreased with some friends. Only four subjects (three Swedes and one Japanese) have increased phone conversations. By occupation (χ^2=43.69, p<.030), a contrast is that large proportions of the high school (12 or 60% of 20) and college students (14 or 54% of 26) have decreased phone conversations, while 15 or 44% of the full-time employees have not changed their phone conversation frequency and time with friends. By household (χ^2=46.45, p<.016), those who live with spouse and child(ren) have the largest proportion of subjects who have reported no change (11 of 20), while 15 (54%)

of younger people who live with parents, parents and siblings, and parents, siblings and a grandmother have decreased phone conversations with friends. Of 31 who live alone, 18 (58%) have decreased phone conversations.

Among the Swedish types, 8 of 11 Practical Users, 7 of 8 Young Social Networkers, 6 of 7 Veteran E-mail Users decreased phone conversations with friends, while none of 4 Heavy Female Users has changed at all (χ^2=19.08, p<.004). Among the Japanese types (χ^2=24.33, p<.004), the Non-believer type has the largest proportion of subjects who has reported no change (10 of 18), while only one of 12 Emotional Users, and 2 of 8 Student-like, Heavy Users have not changed phone conversations. All 7 Reserved Writers have decreased phone conversations with friends. According to the results of the Q-statement #7, I exchange SMS mostly with people at my age, Young Social Networkers, Student-like, Heavy Users, and Text-Messaging Lovers have scored high (factor score=4), indicating that these are the younger, student-type communicators. Whether subjects communicate the same-gender friends or not (Q-statement #8) is much less variant (highest factor score=2) in all three data sets.

A what-if question asking respondents whether they could maintain relationship with friends without using m-mail (Q12 a) has yielded, surprisingly, no statistically significant variance. Of 92 respondents, 48 (52%) has said they could, 14 (15%) have said they could not, and 30 (33%) have said it depends on the friend. This indicates that nearly a half of the respondents feel a need for m-mail to communicate with at least some of their friends. It is interesting that age, occupation, and household has not yielded significant variance. It may be because people communicate with friends using all kinds of communication methods so that when m-mail cannot be used they could use the phone or, if feasible, meet FtF to communicate with each other. Students can meet their school friends every day anyway. This item is cross-tabulated with the changed friendship item to find out any link between these two. Of 14 subjects who have said they would need m-mail to maintain the same level of friendship, six believe they have improved, five do not think relationships with friends have actually changed, two claim they have even worsened, and one is not certain about friendship but m-mail provides him with better communication with friends.

People understand they must call, instead of sending m-mail, under certain circumstances, such as when the topic is highly emotional or sensitive, when the conversation is expected to last long, and in an emergency. A 19-year old Japanese college student described to me, "I feel as if I were connected to my friends even though we don't talk on the phone. It has even become too much trouble to make a call and talk. I feel bad about it lately... .I feel I am losing skills to express myself over the phone." She also confided to me that although frequent m-mail communication with friends gave her the impression that she and her friends were psychologically close to each other, she was not sure whether such connections were real or just illusions. A reason why about a half of the subjects have said that they could do without m-mail to maintain the same friendship may be because people know that each communication method has advantages and disadvantages and that a single method cannot take care of all of their needs.

Among the Q-statements, S#6, I feel left out when I do not receive any SMS messages for a while, is the closest to what Q12 a) intended to ask. The factor scores of this statement are as below:

S#6: I feel left out when I do not receive any SMS messages for a while.

SW	PU	YSN	VEU	HFU	
	-1	3	-2	0	
JP	NB	EU	SHU	RW	
	-2	1	-3	2	
COM	RM	HVD	RU	TML	CIU
	0	1	-2	-2	-2

The Young Social Netwokers type has the highest normalized score (z score=1.11), and Confident Infrequent Users and Reluctant Users have normalized scores less than -1 (-1.07 and -1.03 respectively). The other types' scores are close to neutral.

When exploring alternatives to m-mail, the Q-statement #30, SMS is more important than e-mail to me as a personal communication tool, and #26, people understand me better when I talk to them on the phone than when I communicate with them by SMS, may help to better understand respondents' preferred way of communicating with others. The factor scores for these statements are shown below:

S#30: SMS is more important than e-mail to me as a personal communication tool.

SW	PU	YSN	VEU	HFU	
	-2	2	-1	3	
JP	NB	EU	SHU	RW	
	-3	1	1	0	
COM	RM	HVD	RU	TML	CIU
	-2	2	-2	1	-3

S#26: People understand me better when I talk to them on the phone than when I communicate with them by SMS.

SW	PU	YSN	VEU	HFU	
	4	2	-3	1	
JP	NB	EU	SHU	RW	
	3	1	1	-2	
COM	RM	HVD	RU	TML	CIU
	4	-1	3	-1	0

According to these two statements, Practical Users, Non-believers, and Reluctant Users appear to prefer talking to e-mail or m-mail. For Young Social Networkers and Heavy Female Users, m-mail is more important than e-mail, and yet these types perceive people understand them through conversations than text messaging. The Veteran E-Mail Users type is an interesting group. For them, in

general, e-mail is marginally more important than m-mail, but compared with talking, they feel that m-mail is more effective for them.

Almost the reversal of S#26 results appears with the Q-statement #27, it is easier to express myself by SMS than by face-to-face or phone interactions. However, the #27 statement is rather about respondents' personal preference than their perception of effective media. The results of Q-sorting for this statement underline Reserved Writers and Text-Messaging Lovers as m-mail lovers, but the characteristics of Veteral E-mail Users discussed above (S#26) fade here.

S#27: It is easier to express myself by SMS than by face-to-face or phone interactions.

SW	PU	YSN	VEU	HFU	
	-4	-2	-2	-1	
JP	NB	EU	SHU	RW	
	-4	-3	1	2	
COM	RM	HVD	RU	TML	CIU
	-4	-2	-4	3	-4

In support of these results, several interviewees confessed during my pilot study, "I don't enjoy talking on the phone, " or "I hate the telephone." A Japanese female high school student said to me, "I never talked to her before in school but knew her mobile address. One day I sent her a mail and I found she was very easy to communicate with." A Japanese male in the 40s said, "On the phone, my friend would not disclose her real intention, but in keitai-mail, she is frank with me...I understand her better now."

5.2.2.2 Kinship

Respondents are more negative toward the idea that m-mail improves relationships with family than the idea that m-mail improves relationships with friends. Responding to a question as to whether relationships with family members have

changed (Q11), most subjects (72 or 76% of 95) have claimed no change. Twenty (21%) subjects think their family relationships have improved. No significant variance by demographic variable or by type has found, except that the gender difference in the Japanese sample is marginally significant (χ^2=5.34, p<.069), in which seven of ten subjects who have said yes are female.

The Q-statement #10, SMS improves my relationships with family/relatives, is in parallel to Q11 in the survey. The factor scores of this statement are as follows:

S#10: SMS improves my relationships with family/relatives.

SW	PU	YSN	VEU	HFU	
	-1	-1	2	-2	
JP	NB	EU	SHU	RW	
	-3	-1	0	1	
COM	RM	HVD	RU	TML	CIU
	-1	0	-3	0	-2

Veteran E-mail Users are the most positive (z score=0.73) and Reluctant Users are the most negative (z score=-1.21). Respondents are more negative toward this statement, compared with the change-friendship statement (S#9) above. Of 96, 77 have chosen this statement to be either at the same level as the friendship statement or more negative. This is likely a reflection of their notion that kinship could be maintained without m-mail and that FtF and phone interactions are enough to keep family together. Friendship is by choice, but kinship is not. Kinship is permanent. Another reason why many respondents have chosen this statement to be rather negative is that at least 32 of 96 subjects do not currently use m-mail to communicate with family, so that m-mail for them is an unnecessary tool to maintain family ties. Of these 32 (8 Swedes and 24 Japanese) who do not send or receive m-mail to/from family, three subjects have placed this statement at 1, 2, and 3 on the scale respectively, and the rest have chosen somewhere between -4 and 0.

Frequency and time spent for FtF interactions with family (Q9 c) have not changed for many. Of 95 respondents, 78 have not changed, five have increased, four have decreased, and two have said it depends on the family member. This item has no significant variance by demographic variable. Variance across the Japanese types is the only one statistically significant (χ^2=23.84, p<.021). Of seven Reserved Writers, unlike the rest, three say no change, while three have decreased. No other subjects in the Japanese sample have reported a decrease. All these three subjects in this type have decreased phone conversations with friends also.

Another what-if question asking respondents whether they could maintain relationship with family members without using m-mail (Q12 b) has yielded no statistically significant variance by demographic variable and by type, except that in the Swedish-only sample, variance by household has been found significant (χ^2=21.13, p<.049). Of 31 Swedish respondents, all four subjects who live with parents and siblings and most of the subjects who live alone (11 of 12) have said they could maintain the same family relationships without m-mail, and the rest have split answers. In general, though, m-mail seems to be less important for communication among family members. One-third of the entire respondents (32) do not exchange m-mail with family members. Of 64 respondents who exchange m-mail with family in varying degrees, 46 (72%) say they could maintain the same relationships without m-mail, 12 (19%) do not think so, and 6 (9%) think it depends on the family member. Only one subject (Swedish male) has said he could not maintain the same level of relationship with family without m-mail but he could maintain friendship without using this medium. The others who could not maintain family relationships without m-mail think they could not maintain friendship without it, either, or it depends on the friend.

Although many think m-mail has not changed their fundamental family relationships, there are some visible effects of m-mail in family settings, according to my interviewees. For example, a Japanese female in the 30s said, "I don't think it has affected the relationship with my husband, but it is more convenient now because we can contact each other easily. It reduces frustration. I wish I had it when we were dating. I could have sent a message to him to let him know I might be a little late."

Another Japanese female interviewee in the 30s told me, "I meet with one of my sisters more frequently than before. When she did not have a cell phone, I called her home late at night, but she was sleepy and I felt bad. But now I can send a keitai-mail at night and she reads it in the morning. Then, she contacts me, ' I am available. Shall we go to a dinner tonight?' The other sister does not have a cell phone and I talk to her only once a month or so because there is no specific thing I must call her about."

5.2.3 Research Question 3

The third Research Question is about in-country variance. This question has been partially answered in the previous sections, particularly about variance by type. In this section, therefore, I discuss findings that have not yet been covered and provide additional information reinforcing some of the discussions already presented.

> **RQ3.** Do the patterns found in RQ1 and RQ2 vary by demographic variable (e.g., gender, age and occupation) and by type (i.e., varied attitudes toward interpersonal communication and the use of m-mail) within a single culture?

Based on literature and my 2001 interview research, prior to data collection, age was a predicted differentiating variable for m-mail communication behavior. Younger people use m-mail more than older people. This study has identified, however, occupation may be an even stronger demographic variable to explain differences in various aspects of communication behavior. Household type is as strong as occupation and age in Japan. If a person is a high school or college student, lives with parents and siblings, and is in the teens or 20s, it is highly probable that this individual is a heavy user of m-mail, although his/her attitude toward m-mail and social interaction partially dictates how this student uses m-mail. By examining in-country data, detailed m-mail use for each city has surfaced. First I present patterns of the Swedish sample and then those of the Japanese sample.

4.3.3.1 Sweden

The first variable to examine is frequency of m-mail. As discussed above (see Table 5.1), variance of the number of m-mail messages sent to friends and the number

of m-mail messages received from friends by type have been found statistically significant ($p<.059$ and $p<.022$ respectively), although the former is marginally significant. When examined by demographic variable, these items are not statistically significant. Only age shows marginally significant results ($p<.097$ and $p<.087$ respectively). Respondents send 1.34 (age 40-49) to 3.86 (age 30-39) messages a day to friends, and receive 1.34 (age 40-49) to 3.71 (age 30-39) messages a day from friends (Table 5.5). This is somewhat surprising considering the general notion among Swedish people and literature that teenagers are the main users of m-mail. This study did not find strong evidence to support the general belief as far as the Swedish sample is concerned.

Table 5.5: Means of M-mail Messages Sent and Received to/from Friends Each Day by Age

Age	n	# m-mails sent to friends a day	# m-mails received from friends a day
16-19	10	3.385	3.515
20-29	14	2.257	2.303
30-39	7	3.857	3.714
40-49	3	1.337	1.337
50-59	6	1.343	1.343
Total	40	2.613	2.637
F		2.139	2.222
p<		.097 ms	.087 ms

Significant variance has been found in the number of calls on the fixed phone, instead. Variance for the number of fixed-phone calls to friends is significant by age, occupation, and household, the number of fixed-phone calls from friends is significant by occupation and household, and the number of fixed-phone calls to family is significant by age and household (Table 5.6). The age, occupation, and household variables are related to one another to some extent because younger people tend to be high school or college students and live with parents or parents and siblings, while many older people are full-time employees and live with spouse or spouse and children. But there are some areas where these variables do no match. Those who live alone

could be either college students or full-time employees. People in the early 20s could be full-time employees or unemployed.

Table 5.6: Statistically Significant Items concerning Fixed-Phone

Item	F	p<	Patterns
Phone calls to friends by age	3.77	.012	Teenagers make nearly 4 calls per day, while those in the 40s and 50s make 1.
Phone calls to friends by occupation	6.86	.000	High school students make 4, while full-time employees make 1.
Phone calls to friends by household	4.20	.003	Those who live with parents and siblings make >4, and with children, .76.
Phone calls from friends by occupation	5.08	.001	High school students receive >3, while full-time employees receive <1.
Phone calls from friends by household	2.43	.025	Those who live with parents receive >3, while those who live with spouse receive .62.
Phone calls to family by age	3.76	.012	Subjects in the 50s make >2 calls, while teenagers make .81.
Phone calls to family by household	2.78	.027	Those who live with spouse make >2, while those who live with parents and siblings make .52.

The number of people respondents are communicating with via m-mail has not yielded any significant variance by age, gender, occupation, or household. Only significant variance is how many m-mail friends respondents meet FtF at least five days a week. This item is statistically significant when examined by age ($F=2.98$, $p<.032$) and occupation ($F=3.88$, $p<.007$). Students in the teens and 20s meet their friends, whom they communicate with via m-mail, significantly often than the other age and occupation groups. This is understandable because students often communicate with other students via m-mail and they see each other at school.

Variance for the number of mobile phone calls and e-mail messages to/from family and friends is not significant by any demographic variable. In terms of length of use, although older age groups have used the mobile phone longer, they have used m-mail for shorter periods of time than younger respondents (Table 4.24). Only the length of mobile phone use is statistically significant, however. Variance for the mobile phone

item is also statistically significant by occupation (F=3.31, p<.016). Full-time employees have used the mobile phone for more than five years on average, while high school students have used 3.4 years and college students, 3.9 years.

Table 5.7: Means of Length of Mobile Phone and M-Mail Use by Age

Age	n	# years mobile phone has been used	# years m-mail has been used
16-19	10	3.46	3.13
20-29	13	3.39	3.06
30-39	7	3.88	2.99
40-49	3	5.33	2.67
50-59	6	6.12	2.50
Total	39	4.07	2.29
F		3.57	.26
p<		.015	ns

The dependency items have yielded interesting results. Dependency has been measured using a 11-point scale ranging from 0 to 10, with 5 being the middle point. Results illustrate what group depends on which communication mode. For example, variance by age (Table 5.8) shows that people in the teens and 20s depend on FtF interactions the most and e-mail the least. The fixed-phone is also important for teenagers. M-mail dependency is in the middle (i.e., 2nd or 3rd place) for all age groups except for the 50s. For respondents in the 50s, m-mail is the least dependable communication mode. The FtF dependency for the 40s seems to be low. This may be because there are only three subjects in this age group and they happen to be the type of people who do not meet friends often. The sample used in this study may not be representative of the population. Statistical measures are used only to better understand the respondents' m-mail use attitudes and behavior.

Table 5.8: Means of Communication Mode Dependency by Age

Age	n	E-mail	Face-to-face	M-mail	Fixed phone
16-19	10	2.40	7.80	5.70	7.60
20-29	14	4.43	8.21	5.64	5.36
30-39	7	6.57	5.43	5.71	5.71
40-49	3	6.00	2.33	4.67	6.00
50-59	6	4.50	7.17	4.00	4.83
Total	40	4.26	7.03	5.35	5.95
F		3.14	4.23	.78	1.26
p<		.026	.007	ns	ns

Variance of e-mail dependency is also statistically significant when this item is examined by occupation ($F=2.97$, $p<.025$) and household ($F=2.70$, $p<.031$). High school students tend not to depend on e-mail (mean=2.00), while full-time employees depend on e-mail more (mean=5.63). Also, younger people who live parents or parents and siblings tend to have lower dependency (1.75 and 2.00 respectively), while those who live alone or live with spouse have higher dependency (5.79 and 5.60 respectively) on e-mail.

M-mail dependency is only marginally significant by gender ($F=3.30$, $p<.077$). Female respondents tend to depend on m-mail more than male respondents (6.00 vs. 4.76).

Two immediacy dimensions of m-mail, the impersonal-personal and unsociable-sociable adjective pairs, have significant variance by occupation (Table 5.9). These psychological items have been measured using a 7-point scale ranging 1 to 7, with 4 being the middle point. Full-time employees most strongly feel that m-mail is personal and sociable among the occupation groups.

Table 5.9: Means of Immediacy Dimensions by Occupation

Occupation	n	Impersonal-personal	Unsociable-sociable
High school student	9	4.78	4.33
College student	10	4.90	4.89
Graduate student	3	4.00	5.00
Full-time employee	16	5.94	5.60
Part-time employee	1	4.00	4.00
Unemployed	1	2.00	1.00
Total	40	5.13	4.92
F		2.64	2.69
p<		.040	.039

Only a few variables concerning m-mail content are statistically significant in the Swedish sample. One such item is whether respondents use words and phrases that have special meanings for only the communicators (Q7 d). Variance by occupation for this item is significant (χ^2=11.40, p<.044). All nine high school students have answered yes, while three of ten college students and nine of 16 full-time employees use such words and phrases. Another item is how often respondents share m-mail content with people around them (Q19 c). This one is significant by age (χ^2=22.13, p<.036). Subjects in the 40s and 50s tend not to share content, but all other age groups, except one teenager, share m-mail content at least occasionally.

Some relationship items in the survey also have revealed significant variance (Table 5.10). Occupation seems to be the most prevalent factor for these.

Table 5.10: Statistically Significant Items concerning Relationships

Item	χ^2	p<	Patterns
Rel. with friends changed because of m-mail? Variance by occupation	23.32	.025	Changed for more than 60% of students (worsened for 2). Improved for 5 of 16 full-time employees.
Ended rel. via m-mail? Variance by occupation	14.00	.016	Yes for 2 students and one part-time employee. No for the rest.
Maintain family rel. without m-mail? Variance by household	21.13	.049	Yes for those who live with parents and siblings and 11 of 12 who live alone. The rest are split between Y and N.
Freq/time of phone conv. with friends changed? Variance by occupation Variance by gender	19.51 10.39	.034 .006	Students decreased, while employees are split between no change and decreased. 75% males decreased, while 56% females have not changed.
Virtual m-mail friends? Variance by occupation	32.81	.005	All 3 who currently have VF on m-mail are HS students. None of employees and none of grad students have had one.
Virtual e-mail friends? Variance by occupation Variance by age	37.95 22.81	.001 .029	All HS students had or have VF. 50% of college students and 65% of employees have never had one. All 40s, most of 50s and 20s do not have one.
Chat with strangers online? Variance by household	25.08	.014	Those who live with parents or parents and siblings tend to do so.
M-mail cmu with people in the same workplace/school? Variance by occupation	21.46	.018	All or some do for students. More than a half of employees do not have m-mail friends at the same work place.

It appears that students, particularly high school students, have peculiar communication behavior compared with non-students. Overall, occupation seems to be the most clearly differentiating demographic variable for the Swedish sample.

5.2.3.2 Japan

The Japanese sample in most part is more diverse than the Swedish counterpart. This sub-section begins with frequency of m-mail use, as was the case with the Swedish sample. As shown in Table 5.2, variance of four m-mail frequency items--the number of m-mail messages sent to and received from friends and family--by type have been

found statistically significant ($p<.003$, $p<.004$, $p<.004$, and $p<.007$ respectively). Demographic variables also show significance. Frequency of m-mail exchanges with friends is significant when examined by age, occupation and household. Variance for the number of messages sent to family by gender is also significant. Younger respondents in high schools and colleges send and receive significantly more messages to/from friends each day than older non-student adults. There are extreme m-mail users in Japan, judging from the frequency perspective. They are causing the higher mean values of m-mail exchanges with friends, compared with the Swedish means. Such m-mail behavior of Japanese youth is a striking contrast with Swedish m-mail users. Further discussions on inter-country differences are made in the next section.

M-mail use volume to and from friends also significantly varies by age, occupation, and household as shown in Table 5.11.

Table 5.11: Means of M-mail Messages Sent and Received to/from Friends Each Day by Age, Occupation, and Household

Age	n	# m-mails sent to friends a day	# m-mails received from friends a day
16-19	20	12.77	13.32
20-29	13	14.30	14.69
30-39	9	1.00	1.00
40-49	9	1.28	1.50
50-59	5	1.32	1.52
Total	56	8.37	8.71
F		5.39	5.58
p<		.001	.001
Occupation	**n**	**# m-mails sent to friends a day**	**# m-mails received from friends a day**
High school	11	16.18	16.69
College	17	14.16	15.12
Full-time employee	19	1.70	1.70
Part-time employee	2	0.18	0.18
Business owner	1	1.00	2.00
Housewife	6	1.84	2.17
Total	56	8.37	8.71
F		6.02	6.43
p<		.000	.000
Household	**n**	**# m-mails sent to friends a day**	**# m-mails received from friends a day**
Spouse	3	1.43	1.43
Spouse & child(ren)	16	1.29	1.48
Parent(s)	2	24.00	24.00
Parent(s) & sibling(s)	13	16.08	16.46
Parent(s), sib&grandma	3	7.67	9.33
Alone	18	8.53	8.59
Other	1	10.00	15.00
Total	56	8.37	8.71
F		3.85	3.90
p<		.003	.003

Significant variance has been found in frequency of mobile phone calls to/from friends and family by household (to friends: F=69.32, p<.000; from friends: F=153.80, p<.000; to family: F=2.99, p<.014,; from family: F=2.54, p<.032). Those who live with parents tend to make more mobile phone calls to/from friends (3.5 and 2.5 calls a day

respectively) and receive more mobile phone calls from family (1.5 calls a day), but they make less (one every other day) mobile phone calls to family, compared with the other groups. Variance for the number of mobile phone calls to family is also significant by age ($F=3.42$, $p<.015$). The 50-59 age group makes 1.5 calls a day on average, while the 16-19 age group makes only 0.4 calls a day. However, the volume of mobile phone calls is much smaller, particularly between family members, than the number of m-mail messages exchanged.

Additionally, the number of fixed phone calls from friends is significant by age ($F=3.41$, $p<.015$), and the number of fixed phone calls from family is significant by occupation ($F=3.21$, $p<..014$). The 20-29 age group receives the least number of phone calls (mean=0.16) and the 50-59 age group receives the largest number of phone calls (mean=2.00) a day from friends. Housewives receive phone calls from family (mean=1.38) more than the other occupation groups.

The questions regarding breadth of social networks in terms of the number of people respondents communicate with frequently--with how many people respondents communicate with by m-mail often (Q 4) and how many m-mail friends they see often (Q5)--show more variance in the Japanese sample than in the Swedish one. Variance for these items is significant between different occupations, household types, and age groups (Table 5.12).

Table 5.12: Means of # Different People Communicating by M-mail and Meeting FtF by Occupation, Household, and Age

Occupation	n	# people to whom they send >1 m-mail a day	# people from whom they receive >1 m-mail a day	# m-mail friends whom they meet FtF >5 days/week
High school	10	2.30	2.40	15.10
College	17	3.24	2.59	4.75
Full-time employee	19	0.84	0.89	0.16
Part-time employee	2	0.00	0.00	0.00
Business owner	1	1.00	1.00	0.00
Housewife	6	1.67	1.92	0.17
Total	55	1.91	1.75	4.28
F		2.81	2.87	4.22
p<		.026	.038	.003
Household	**n**			
Spouse	3	1.33	1.00	0.33
Spouse & child(ren)	16	0.94	1.03	0.06
Parent(s)	1	3.00	2.00	0.00
Parent(s) & sibling(s)	13	3.85	3.31	13.46
Parent(s), sib&grandma	3	1.67	1.61	6.67
Alone	18	1.28	1.28	1.76
Other	1	5.00	3.00	4.00
Total	55	1.91	1.75	4.28
F		3.44	2.44	3.20
p<		.007	.038	.010
Age	**n**			
16-19	20	3.11	2.63	11.20
20-29	13	1.92	1.85	2.08
30-39	9	0.61	0.78	0.11
40-49	9	1.00	1.11	0.11
50-59	5	1.30	1.00	0.00
Total	56	1.91	1.75	4.28
F		2.88	2.04	4.01
p<		.032	ns	.007

Gender is not significant for the item: the number of different people to communicate by m-mail more than one a day. But female subjects send to and receive from more people at least two messages a week than male counterparts. The female subjects on average send 2-6 m-mail messages a week to more than three different people, while the male subjects send to less than two people at this frequency ($F=4.71$, $p<.034$). Similarly, women receive 2-6 m-mail messages a week from more than three different people, and men receive from less than two people ($F=4.06$, $p<.049$).

In terms of length of communication tool use, older age groups have used the mobile phone longer than younger respondents, those who are in the 20s have used m-mail the longest, and subjects in the 30s have used e-mail the longest periods of time (Table 5.13). Variance for the mobile phone and e-mail use year items is also statistically significant by occupation (Table 5.13).

Table 5.13: Means of Mobile Phone, M-Mail, and E-mail Use Years by Age and Occupation

Age	n	# years mobile ph has been used	# years m-mail has been used	n	# years e-mail has been used
16-19	20	2.10	1.59	12	2.11
20-29	13	3.72	3.00	11	3.37
30-39	9	5.82	1.48	8	6.32
40-49	9	4.00	2.34	8	6.00
50-59	5	5.82	1.78	5	3.25
Total	56	3.69	2.04	44	4.03
F		6.71	3.96		2.90
p<		.000	.007		.034
Occupation	**n**	**# years mobile ph has been used**	**# years m-mail has been used**		**# years e-mail has been used**
High school	11	2.00	1.82	6	3.34
College	17	2.31	1.83	12	0.81
Full-time em.	19	4.94	2.60	19	6.14
Part-time em.	2	3.50	0.92	2	2.50
Bus owner	1	7.00	3.00	1	2.25
Housewife	6	6.20	1.47	4	5.90
Total	56	3.69	2.03	44	4.03
F		8.18	1.77		5.68
p<		.000	ns		.001

Variance for the mobile phone item is significant by household as well ($F=4.77$, $p<.001$). Adults who live with spouse and children have used the mobile phone for 5.8 years, while students who live with parents, siblings, and a grandmother have used it for 1.3 years on average. Gender does not make a difference in any of these variables.

Like the Swedish sample, the Japanese sample shows interesting results of the dependency items. They illustrate what demographic group depends on which communication mode. For example, variance by age (Table 5.14) shows that teenagers depend on FtF the most and the e-mail the least, and people in the 20s depend on m-mail the most and the fixed phone the least. For people in the 50s, FtF and e-mail are equally important. Age variance can be translated into occupation variance with some minor adjustments. High school and college students depend on FtF the most and m-mail the second most, while their dependency on e-mail and the fixed phone is quite low. Full-time and part-time employees, on the other hand, depend on e-mail the most and FtF the next. It is interesting to note that housewives depend on both FtF and the fixed phone a lot. Thus, the level of m-mail dependency vis-à-vis that of the other communication modes varies according to the age group and the type of occupation.

Table 5.14: Means of Communication Mode Dependency by Age and Occupation

Age	n	E-mail	Face-to-face	M-mail	Fixed phone
16-19	20	0.75	8.70	6.70	2.65
20-29	13	3.62	7.15	7.92	0.92
30-39	9	6.00	7.11	5.00	3.89
40-49	8	6.75	7.12	4.89	4.00
50-59	5	7.00	7.00	4.40	5.80
Total	55	3.72	7.69	6.21	2.95
F		10.48	1.67	2.62	3.99
p<		.000	ns	.046	.007
Occupation	**n**				
High school	11	0.00	8.55	6.73	3.00
College	17	1.59	8.35	7.52	1.65
Full-time emp.	19	7.16	6.78	5.37	2.95
Part-time emp.	2	7.50	6.50	4.00	5.50
Bus owner	1	2.00	3.00	2.00	2.00
Housewife	6	5.00	8.17	5.67	5.83
Total	56	3.73	7.69	6.21	2.95
F		17.59	2.58	1.70	2.41
p<		.000	.038	ns	.049

Variance of e-mail dependency is also statistically significant when this item is examined by household ($F=4.68$, $p<.001$). Younger people who live parents, siblings and a grandmother show no dependency, while those who live with spouse have the highest dependency (8.33) on e-mail.

The Japanese sample also has revealed significant diversity in the immediacy items (Q14). The occupation variable is most prevalent (Table 5.15). Housewives have constantly rated higher than the others except for the impersonal-personal adjective pair.

Table 5.15: Means of Immediacy Dimensions by Occupation

Occupation	n	Impersonal -personal	Unnatural-natural	Insensitive -sensitive	Unsociable - sociable
High school	10	4.70	4.90	5.11	5.50
College	17	4.65	4.65	4.53	4.76
Full-time emp,	18	5.56	4.50	4.72	4.50
Part-time emp.	2	4.50	4.50	3.50	4.00
Business owner	1	1.00	1.00	1.00	1.00
Housewife	6	5.50	6.33	5.67	5.83
Total	54	4.98	4.76	4.72	4.83
p<		.044	.001	.009	.007

Variance for the unnatural-natural pair is also significant by age. Those who are in the 50s feel m-mail is rather unnatural (mean=3.60), while people in the 30s feel the medium is more natural than unnatural (mean=5.38). Age is linked to occupation in this case because most of the housewives are in the 30s. Variance for the unsociable-sociable pair is significant by gender (F=4.18, p<.046). Female respondents, more than males, feel that m-mail is sociable (female mean=5.24, male mean=4.48).

A few variables concerning m-mail content are statistically significant in the Japanese sample. One such item is how often respondents share m-mail content with people around them (Q19 c). This one is significant by age (χ^2=19.87, p<.011) and by household type (χ^2=25.43, p<.013). All age groups share content, but teenagers do that most frequently. Younger people who live parents, parents and siblings, or parents, siblings, and grandmother share m-mail content with others. Collaboration of m-mail content by household is marginally significant (χ^2=20.24, p<.063). A half of the subjects who live with parents or parents and siblings collaborate m-mail messages from time to time.

Some relationship items in the survey also have revealed significant variance (Table 5.16). Household type is often the differentiating factor for these.

Table 5.16: Statistically Significant Items concerning Relationships

Item	χ^2	p<	Patterns
Rel. with friends changed because of m-mail? Variance by age	13.78	.088 ms	14 of 20 teenagers feel relationships with friends have been improved.
Rel. with family changed because of m-mail? Variance by gender	5.34	0.69 ms	Females tend to think family rel has been improved more than males.
Made friends via m-mail? Variance by household Variance by age Variance by occupation	18.69 13.63 10.21	.005 .009 .070 ms	13 of 16 people who live parents and siblings (and grandma) made friends. 15 of 20 teenagers say yes. 18 of 28 HS and coll students made new friends via m-mail.
Ended rel. via m-mail? Variance by occupation Variance by household Variance by age	12.24 12.37 9.07	.032 .054 .059 ms	HS students did that the most, and the college students the second most. Those who live with spouse or spouse and child(ren) never did that. Younger people tended to use m-mail for this purpose than older people.
Freq/time of phone conv. with friends changed? Variance by household	39.64	.023	50% who live with spouse and children claim no change.
Virtual m-mail friends? Variance by household	29.94	.038	Those who live with spouse or spouse and children never had one.
Virtual e-mail friends? Variance by household	66.09	.000	Only one who live with spouse and children currently have VFe. Many young people do not use m-mail.
Chat with strangers online? Variance by occupation Variance by household	15.60 15.27	.008 .018	6 of 11 HS students chat with strangers from time to time. 6 of 16 who live with parents and siblings (and grandma) do sometimes.
M-mail cmu with people in the same workplace/school? Variance by age Variance by occupation	32.47 36.03	.001 .002	For teenagers, all or some of m-mail friends at the same school All HS and college students have all or some of m-mail friends at the same school.

Note:
ms: Marginally significant

In case of the Japanese sample, age, occupation, and household type are almost equally strong differentiating variables.

Thus, from the demographic viewpoint, occupation, household, and age are important variables to consider for explaining different communication attitudes and behaviors. But each country is a little different from each other as to which demographic variables are linked to which items and what variance. Although only a few differences have been found between male and female subjects in terms of the frequency of m-mail use, the gender difference may be somewhat translated into the make-up of the types. Males dominate Non-believers and Reluctant Users, while Heavy Female Users and Confident Infrequent Users are female-only types. This in turn could mean that men's and women's attitude toward communication technology is different from each other in some aspects.

However, even within the same demographic group within the same country, there may be variations, for example, within a younger age group. To illustrate this, I analyze significant variance among the subjects in the teens and 20s.

In Sweden, there are no significant differences in m-mail exchanges among these younger generations (n=24), but the volumes of fixed phone calls made to friends and received from friends vary significantly according to age and occupation. High school students (all teenagers) make four calls to friends and receive more than three on average, while college students in the 20s make 2.7 and receive 2.7 and non-students in the 20s make one and receive one. The reason why high school students make more phone calls is likely that they live with family in their homes and their parents pay for the cost of the home phone. Most teenagers pay the monthly mobile phone bill, including m-mail cost, out of the money they earn through a second job. Swedish high school students shorten words, phrases, or sentences in m-mail frequently, while college and graduate students and non-students in the 20s do so less frequently. All Swedish high school students use words and phrases with special meanings understood only between the communicators, while more than a half of college students in the 20s do not.

In Japan, the volumes of m-mail messages sent to and received from friends vary significantly among the young subjects (n=33). High school students (all teenagers) on average send more than 16 and receive about 17 a day, while college

students in the teens send about nine and receive more than nine, and college students in the 20s send 21 and receive almost 22 a day. Non-students in the 20s send only 3.5 and receive 3.5. The reason why college students in the teens exchange m-mail messages less than those in the 20s may be that most of the teenage college participants entered the college in April (the beginning of the Japanese fiscal year) 2002 and by the time of my survey they had been in college for less than two months and therefore they might not have many friends on campus. The non-student group has been using the mobile phone, m-mail and e-mail significantly longer than the other subjects in the teens and 20s. Those non-students depend on e-mail a lot (score=7.00), while high school students do not depend on e-mail at all (score=0). The non-students (all full-time employees) use the Internet and e-mail at work, so that for them e-mail must be part of their communication repertoire, while 20 students either do not have access to the Internet or do not use e-mail. Interestingly, communication with strangers in chatrooms shows different patterns among the young people. While only one college student communicates with strangers online, six of 11 high school students do that. None of full-time employees in the 20s use chatrooms.

The major differentiating items, phone calls for the Swedish sample and m-mail volumes for the Japanese samples, that have significant variance among different types and demographic groups, have also appeared when only the two youngest age groups—the teens and the 20s--are examined. There seems to be some differences between students and non-students among the respondents in the 20s. And again, some differences between high school students and college students have revealed.

5.2.4 Research Question 4

The fourth and last Research Question is concerned with possible cultural variance.

> **RQ4.** Are any aspects of m-mail users' communication behavior and usage patterns found in RQ1 and RQ2 attributed to culture? In other words, do variations of communication behavior or usage patterns between Japanese and Swedish users, if any, derive from their cultural differences rather than service-specific differences?

This section presents communication behavior from a quantitative perspective (message/call volumes) as well as from a qualitative viewpoint (m-mail message content), and attitudes toward text messaging including immediacy and dependency. It then explores possible reasons, other than practical ones, why people would use m-mail. Comparisons are made mostly between the Swedish sample and the Japanese sample, and variations among the types and demographic groups are referred to when appropriate.

5.2.4.1 Frequency of m-mail exchanges with friends

The most striking contrast between the two cultures—Sweden and Japan--is the difference in the number of m-mail messages exchanged daily with friends. As Tables 5.1 and 5.2 show, while the Swedish sample on average send friends 2.6 messages and receive 2.6, the Japanese send 8.4 and receive 8.7 each day. The Swedish means are almost the same as the means of Japanese Non-believers'. The Realistic Majority displays the lowest m-mail usage. This type prefers talking to exchanging m-mail. The m-mail message volume gap between Sweden and Japan may derive from this particular reason: The Swedes like to talk, compared with the Japanese. The mobile phone call volume of the Swedish sample is larger than the Japanese sample, with the exception of Reserved Writers. The difference between the Swedish average and the Japanese average is not statistically significant (Table 4.17). As for the call volume of the fixed phone, Japanese respondents on average make one call to friends every other day and receive one call from friends every other day, while the Swedes make about two calls and receive two each day. These items are statistically significant (call: $F=24.06$, $p<.000$; receive: $F=18.81$, $p<.000$; see Table 5.1).

Another reason why Japanese respondents, particularly younger people, send and receive so many m-mail messages may be that they do not use e-mail as much as the Swedish people do. Among those who use e-mail, Swedes send twice as many as Japanese do. Ten Japanese subjects do not use the Internet on the PC. In addition, 14 Japanese respondents who have access to the Internet do not use e-mail (i.e., send and receive no message to/from friends and family). When the Japanese e-mail users and

non-users are compared, the former send friends 4.8 m-mail messages a day and receive 5.2, while non-users of e-mail send 13.5 m-mail messages and receive 13.8 each day. These items are statistically significant ($F=8.73$, $p<.005$ and $F=8.22$, $p<.006$ respectively).

From demographic viewpoints, the Japanese sample is more diverse than the Swedish sample regarding the m-mail exchange among friends. The latter has significant variance only by type and is only marginally significant by age. The Japanese sample has significant variance by age, occupation, household, and type. This indicates that in Japan there are extreme users of m-mail. In Stockholm, only one subject (a female teenager) has reported that she sends ten m-mail messages a day to her friends. The second highest level is six: another female teenager sends six messages to her friends every day. Six subjects in Stockholm send five each. In Tokyo, the heaviest user (a female in the 20s) sends 50 a day, the next heaviest user (a male teenager) sends 40, four (two male teenagers and two females in the 20s) send 30 each, four send 20 each, one sends 15, eleven send ten each, and so on. Those who send friends more than ten m-mail messages a day are all in the teens and 20s. All these heavy users except one are high school and college students. The number of m-mail messages people receive from friends is almost identical to the number of messages they send because m-mail is highly interactive and reciprocal.

The reason why many Japanese do not use e-mail and the fixed phone to communicate with friends may be that, when looked at communication as a whole, most people in Japan maintain relationships by meeting with others FtF. The frequency of such get-togethers in Japan may or may not be at the same level as people in other countries. Although young Japanese use m-mail frequently, such text-based communication may be only supplementing their entire communication routine. For some, the supplementing part is huge, however. Swedish subjects, on the other hand, may be using all kinds of communication means in a balanced manner. Sweden has been one of world's leading countries in adoption and penetration of the telephone, the mobile phone, and the Internet. Japanese's behavior in the use of electronic communication tools can be described as selective.

5.2.4.2 Breadth of m-mail exchange

The difference in the number of people they frequently communicate with by m-mail between the two cities is not statistically significant. In Sweden, subjects send more than one message a day to 1.55 people and receive more than one message from 1.35 people on average (Table 5.4). In Japan, the number is 1.75 in either way. These numbers include family members as well. Since Japanese respondents send and receive more, even when m-mail exchanges with family are taken into account, it can be assumed that they tend to have the same breadth as the Swedish counterparts but thicker m-mail communication than the Swedish. In my survey, questions such as how many people respondents communicate with over the telephone and e-mail are not included. Survey results indicate Swedish subjects make and receive more phone calls and send and receive more e-mail messages than the Japanese. Based on the data available, it is hard to estimate whether Swedish respondents have broader interpersonal networks or Japanese respondents have thicker networks. As far as m-mail communication with friends is concerned, however, Japanese tend to have tightly knitted relationships.

Swedes communicate with more virtual friends via m-mail and e-mail than Japanese, although only the latter is statistically significant. As already mentioned, the concept of virtual friends is relatively new to many Japanese, and Japanese people customarily do not talk to strangers, and these may be the reason behind the smaller number of Japanese respondents having virtual friends. Another reason might be that people are discouraged to talk to strangers online because throughout 2001 the Japanese media often reported crimes associated with dating sites on the mobile Internet.

5.2.4.3 Message content

The RQ1 results section (4.3.1) has shown that Practical Users and Non-believers send primarily practical and informational messages. Most others admit that they send emotional and sociable messages as well. Also it has noted that even if content is trivial, users are pleased to receive m-mail messages from friends. This sub-

section further examines what kinds of m-mail messages are exchanged, using Q-sort results.

Table 5.17 illustrates characteristics of the Swedish and Japanese types from the perspective of message content they send to friends and family.

Table 5.17: Factor Scores of Content-Related Q-Statements by Type

S#	Statement	SW				JP			
		PU	YSN	VEU	HFU	NB	EU	SHU	RW
11	I feel comfortable sending personal, intimate messages to my family members or close friends	1	3	4	1	2	4	3	3
12	SMS is good to have when I feel lonely because I can send messages to my friends for no special reasons.	0	2	2	2	0	3	0	3
14	I send SMS to my friend(s) or family when something good happened to me.	0	1	3	3	0	4	2	0
15	I send SMS to my friend(s) or family to tell them I feel sad or depressed.	0	-1	0	1	-3	3	-1	-1

Even Non-believers and Practical Users who are somewhat cynical about m-mail have scored positive or close to neutral for the first three statements in Table 5.17 above. According to S#11 results, people could send intimate messages to friends and family if they wanted to do so. And some people would use m-mail to release loneliness (S#12). Only Practical Users and Non-believers have negative normalized scores for the statement #12, but these scores are close to neutral (-0.26 and –0.11 respectively). All types, including Practical Users and Non-believers, have positive normalized scores for the statement #14. Good news travel fast. Emotional Users, subjects with high-level disclosure, have the highest factor score and normalized score for this statement. Subjects in both cities, however, tend to avoid telling friends and family that they are sad or depressed, with the exception of Emotional Users whose

normalized score is 1.27. Although the factor score of Heavy Female Users for the statement #15 is positive, its normalized score is 0.27, which is almost neutral.

Language-related statements also reveal some aspects of message content, as shown in Table 5.18.

Table 5.18: Factor Scores of Language-Related Q-Statements by Type

S#	Statement	SW				JP			
		PU	YSN	VEU	HFU	NB	EU	SHU	RW
33	Paralanguage can add my emotional state to a SMS message being sent.	2	0	3	2	1	3	3	0
34	Misspelling and incorrect grammar are tolerated in SMS.	2	4	0	-3	-2	0	2	-2
35	It is OK to use a different language in SMS than e-mail.	3	0	1	-1	0	0	0	-1
28	Sometimes I am afraid the receiver may misunderstand my SMS message because it is a written message.	2	1	0	-1	3	3	-1	1

It is interesting to note that Young Social Networkers and Reserved Writers do not seem to be inclined to use paralanguage, such as smileys (S#33). During my 2001 interview research, several interviewees in both Stockholm and Tokyo mentioned that they did not like to use smileys. On the Japanese mobile phones, a number of emoticons are readily available, but some users do not think that they can express their own self with such standardized icons. Instead they try to come up with more appropriate expressions. A Japanese female in the 30s said, "I don't think one can convey one's feelings via text. When someone writes, for example, 'You fool' it could mean he is angry with you or he is trying to cheer you up. It is difficult to know which only by looking at the words. I try to use expressions and special characters so that the receiver can sense my feelings."

Concerning misspelling and incorrect grammar in m-mail (S#34), Heavy Female Users, Non-believers, and Reserved Writers are against the idea. As far as m-mail language vis-à-vis e-mail language is concerned (S#35), Practical Users seem to agree with and recognize the difference between the two and take advantage of the casual writing style of m-mail. About possible misunderstanding between m-mail communicators, I was expecting that most Japanese respondents would agree with the statement #28 because during my interview research in summer 2001 a number of Japanese respondents mentioned that they were afraid that their friends might misunderstand their messages. For instance, a Japanese female in the 30s said that she was occasionally misunderstood, "I was in a hurry and I thought I was writing all right but the other end reacted in a way I never expected. Only after the person's reaction, I realized I was misunderstood." Student-like, Heavy Users, however, seem to be mildly confident of what they write (z score=-0.60). Practical Users and Young Social Networkers have agreed with the statement, although their normalized scores are less than 1 (0.73 and 0.60 respectively).

5.2.4.4 Immediacy and dependency

How respondents feel about m-mail is one of investigation items. Immediacy dimensions are defined through five pairs of adjectives in the survey: impersonal-personal, cold-warm, unnatural-natural, insensitive-sensitive, and unsociable-sociable. Short, Williams and Christie (1976) used a similar set of measurements for their study of social presence theory. Have the Swedish and Japanese subjects responded differently in my survey? Tables 5.9 and 5.15 are results of immediacy dimension items for Stockholm and Tokyo respectively. No significant variance has found with any of immediacy items between two cities. Means of these items are between 4 and 5 (4 being the middle point) except for the impersonal-personal item in Stockholm. The Swedish sample has the mean value of 5.13 for this item. It appears that subjects in both cities think the immediacy level of m-mail is not too low but not too high, either.

Tables 5.8 and 5.14 indicate dependency of the Swedish and Japanese samples respectively. When these samples' mean values are compared, the Swedish respondents

depend on the fixed phone and e-mail more than the Japanese counterparts, while the Japanese depend on FtF, letters/cards, and m-mail more than the Swedes. Only the fixed phone and letters have yielded significant variance (Table 5.19). In the Stockholm sample, subjects depend on FtF the most, the fixed phone the second most, and m-mail the third most. In Tokyo, subjects depend on FtF the most and m-mail the second most for interpersonal communication. People do not seem to depend on their home phone any longer in Tokyo. A Japanese female in the 30s said during my interview with her, "for arranging meeting with my friends, I used to discuss details with them on the phone, but I no longer do that. In that sense, the time I spend for phone conversations has been reduced."

Table 5.19: Means of Communication Mode Dependency by City

City	n	Fixed phone	e-mail	FtF	Letter	M-mail
Stockholm	40	5.95	4.43	7.03	1.36	5.35
Tokyo	56	2.95	3.73	7.69	2.27	6.21
Total	96	4.20	4.02	7.41	1.89	5.85
F		24.90	.98	1.57	4.11	2.31
p<		.000	ns	ns	.046	ns

Note:
The middle point of this scale is 5.

5.2.4.5 Possible motives for m-mail use

During my 2001 interview research, interviewees told me under what circumstances they would use m-mail (see detailed interview results in Appendix C). In both Stockholm and Tokyo, some people send m-mail at the specific time of the day, such as after work and weekends, and some people used it any time of the day. People use m-mail because they want to say something to somebody. M-mail has no inconvenient time to send and receive, unlike telephone calls. People do not normally call up and talk someone in the middle of the night or during a meeting. M-mail users know that receivers are checking their mobile phones frequently and that replies will be returned soon. They know m-mail can be quite convenient at times. "Faster, cheaper, and sometimes easier than calling" was the typical comment of my interviewees as to

what they liked about m-mail in 2001. Swedish and Japanese users have a lot in common.

I have, however, observed a few social practices that may be influencing the way people use m-mail in each country. In Japan, use of the mobile phone in public transportation systems is socially prohibited. Train conductors, for example, remind passengers every several minutes to switch off the mobile phone because, according to them, conversations would disturb people around the mobile phone user and because signal might cause malfunction of electronic healthcare devices such as a pacemaker. Passengers do not seem to switch off their mobile phones, but they tend not to initiate phone calls. Many passengers, particularly younger ones, begin moving their thumb to type something on the keypad as soon as they get in a train. In Stockholm, subway and bus passengers seem to place and receive calls rather freely during the ride, and conductors and drivers do not intervene mobile phone users in any way.

Another difference is that in Japan parents tend to pay their children's mobile phone bills. Of 28 high school and college students in the Japanese sample, 14 (50%) have said that their parents pay their mobile phone bills, while in Stockholm, 5 (23%) of 22 students do not pay mobile phone bills themselves. In Sweden, and in many other European countries, prepaid mobile service is popular particularly among young people, as users are not charged for monthly basic fee. With prepaid, users may be more sensitive about how much they have spent so far on the card and how frequently they can send m-mail or place calls because once usage reaches the card amount, the user cannot make calls and send m-mails any longer from the phone until the user buys another card. In Japan, prepaid service has recently become available, but none of the subjects use prepaid. With the regular service, users can make as many phone calls and send as many m-mail messages as they like, as long as their budget allows. If an unlimited amount of money were allowed, students would probably use m-mail more often.

For many people, sending and reading m-mail messages is daily routine. As explained in the previous section, results of the Q-statement #13 (A SMS message from my close friend can please or entertain me even when the content is trivial) indicate that

most people do enjoy reading m-mail messages from their friends. Do they enjoy sending m-mail? During my interviews in summer 2001, I had an impression that some m-mail users enjoy sending because they want to tell their feelings or anything came up to their mind to someone when they want to. They do not want to wait until next time they get an opportunity to talk. A question (Q15) asking respondents whether they enjoy sending, receiving, or both has been included in the survey. Only two subjects enjoy receiving more than sending, and the rest enjoy sending more than receiving or enjoy both sending and receiving equally. In Stockholm, the answer is split: 19 (49%) say they enjoy sending and 20 (51%) say they enjoy both. In Tokyo, 32 (58%) enjoy sending, 2 (4%) enjoy receiving, and 41 (44%) enjoy both. The difference between the cities is not statistically significant. Variance for this item is not significant by any demographic variable or by type, either. Saying something to someone, even though what has been said in a message is simple, seems to be the fundamental usage of m-mail. Perhaps, because content can be simple and short, it makes easier and more comfortable for users. If it were a more rigid and formal communication medium, people would not use it for daily casual communication.

Then, do m-mail users send type of content that they could not dare to say on the phone? As mentioned in the RQ1 results section, more than 60% of the entire sample sends m-mail to friends when they feel it would be difficult or awkward to say the same thing over the phone. Variance by city or by any demographic variable is not significant. Before this study, I expected Japanese respondents, more than their Swedish counterparts, might use text when they cannot say something FtF or over the phone. It has turned out, however, that Swedes use the same communication strategy as much as Japanese do.

What else would be possible reasons why people use m-mail over the phone or other communication methods? Results of several Q-statements may indicate part of such reasons. I have already discussed the aspect of exchanging intimate content. Some people in both countries seem to utilize m-mail to exchange intimate and emotional content. I have also examined whether m-mail users perceive that the medium is useful to develop and maintain actual relationships. The answer depends on

the type of the person. Non-believers seem to have the most negative view of m-mail being good for relationship maintenance. The Q-statements also revealed somewhat different trends in attitudes between two countries. Most Swedish subjects are neutral to mildly positive about the role of m-mail in maintaining friendship and neutral to mildly negative about m-mail tightening family relationship. Japanese are more sharply divided among themselves. Areas concerning attitudes toward communication, personal traits, and thoughts about privacy have not been explored so far in this paper. The factor scores of the statements in these areas are shown in Table 5.20:

Table 5.20: Factor Scores of Q-Statements concerning Communication, Personal Trait, and Privacy by Type

S#	Statement	SW				JP			
		PU	YSN	VEU	HFU	NB	EU	SHU	RW
2	Frequent communication is not always required to maintain a good relationship.	1	-1	3	0	2	2	1	-2
6	I feel left out when I don't receive any SMS messages for a while.	-1	3	-2	0	-2	1	-3	2
5	When I talk, I get conscious, but when I send a text message, I don't	-3	-1	-1	-1	-2	-1	-2	1
32	I use SMS when I think I might be intimidated or embarrassed if I made a phone call to someone or met the person face-to-face.	-1	0	-2	-1	-1	0	0	4
27	It is easier to express myself by SMS than by face-to-face or phone interactions.	-4	-2	-2	-1	-4	-3	1	2
41	It is a serious disadvantage not to be able to use (send and receive) SMS.	1	1	0	3	-1	-2	0	-1
43	It was difficult for me to learn how to use (create, send, and read) SMS.	-3	-4	-3	-4	-3	-2	-4	-4
20	I don't want my family to know whom I communicate with.	-1	-1	-2	0	1	-2	-1	2
22	SMS is more private than phone calling because nobody can overhear the voice.	-3	-2	1	0	0	1	-1	0
23	Sometimes I feel my friends & family monitor what I'm doing as they can reach me anytime.	-2	-3	-4	1	-2	-3	-4	-3

It is interesting to know that a large majority of the Swedish and Japanese subjects does not think frequent communication is necessary to maintain a good relationship (S#2). Veteran E-mail Users have the highest normalized score (z=1.13) for this item, while Reserved Writers mildly disagree (z score= –0.76). Even some of the heaviest m-mail users do not think frequent communication is always essential for a good relationship. Of 22 Japanese subjects who send ten or more m-mail messages a day to friends, ten agree with the statement and four are neutral. In the Swedish sample, of 12 who send four or more messages a day to friends, six agree with the statement and one is neutral. In Japan ishin-denshin (Kincaid, 1987), the concept that two or more people understand each other through a shared experience without exchanging words (literally meaning communication from mind to mind) is thought to be evidence of closeness and an ideal form of communication, but even in Sweden, and even among heavy m-mail users, frequent communication is not considered essential. This is one of the areas that future research could further investigate to find out why.

If a person agrees with the statement #2, he/she should likely disagree with the statement #6. All types, except Emotional Users, change polarity from S#2 to S#6. Emotional Users tend to have high-level of disclosure, so that they may not like to be outside a social network.

The statements #5 and #32 naturally have similar results. In the Swedish sample, most people do not seem to have a problem of self-consciousness when they talk. The Reserved Writer type is the only group that has this tendency. Fear of intimidation (S#32) may explain why some people like to send m-mail to friends. In Sweden, intimidation does not seem a problem for most. Only Young Social Networkers have a positive normalized score, but it is almost neutral (z=0.30). In the Japanese sample, only Non-believers have a negative normalized score (z=-0.29) and the rest are positive with Reserved Writers having the highest normalized score (z=1.66). The statement #27 reflects S#5 and S#32. Most Swedish subjects think they

can express themselves by talking than by sending m-mail, while Student-like, Heavy Users and Reserved Writers do not necessarily think so.

Results of the statement #41 show a contrast between two countries. All types of the Swedish respondents agree that not to be able to use m-mail is a disadvantage, while most Japanese do not think so. Student-like, Heavy Users are neutral (z score=0.02) and the other Japanese types have negative scores. These differences can be interpreted that more Swedes than Japanese feel they are benefited from m-mail even though Japanese use m-mail more frequently than Swedes. Interestingly, both samples say that it was not difficult to learn how to use m-mail (S#43).

Results of the privacy-related statements show expected tendencies but they are not so strong as I anticipated. In smaller houses with more family members in the same household, it is more difficult to have privacy in Japanese homes than in Swedish homes. Particularly Reserved Writers tend to be private (S#20). During my interview research in summer 2001, a female college student in Tokyo said, "When I was in high school, I called a boy and his parent answered the phone. It was awkward. With the mobile phone, I don't have to ask 'May I speak to ...' and the person I want to talk is always at the other end." Another Japanese female student told me a negative side of perpetual contact, " I feel I am always watched....I am watched by people like my boyfriend. Mail always reaches me and I feel as if I didn't have my own free time....When I want to be left alone, I switch off my cell phone." Related to this point, a female college student in Stockholm commented on the mobile phone, "Sometimes it can be a stress factor because it always be able to reach all the way. But that's not a big problem for me because I can go off. But sometimes it can be a stress, you know,...sometimes someone is supposed to call you but not calling you. That's a stress factor."

M-mail may not be perceived as private (S#22) because, as discussed in the RQ1 results section, 79% of the entire subjects share content of messages with others and some even collaborate messages. More Swedish respondents than Japanese share m-mail content. Most Japanese respondents are neutral about S#22, but Practical Users and Young Social Networkers disagree that m-mail is private (z scores=-1.09 and –0.91

respectively). Japanese respondents do not feel that their friends and family monitor them because they can be reached all the time via the mobile phone (S#23). Most Swedish respondents feel the same way. Only Heavy Female Users, though not strongly (z score=0.54), sometimes feel that friends and family are checking on them.

5.2.4.6 Occupation and household as important differentiating factors

In the demographic section, I discussed that the Swedish and Japanese samples have significantly different family structures (i.e., the other members of the same household). Japanese subjects who live with family have more family members than Swedish counterparts. In the RQ3 results section, I mentioned that the age, occupation, and household variables are related because younger people tend to be students and live with parents or parents and siblings, while many older people are full-time employees and live with spouse or spouse and children. In the Stockholm sample, of nine high school students, four live with parent(s) and five live with parent(s) and sibling(s). Of 11 Japanese high school students, one live with parents, seven live with parents and sibling(s), and three live with parent(s), sibling(s), and grandmother. The difference between the two samples for the high school segment is marginally significant (χ^2=4.98, p<.083).

Although age and occupation, when examined separately, do not show statistically significant variance between Stockholm and Tokyo, further analyses have found one sub-group marginally significant and one significant. The marginally significant one is occupation by city for the 16-19 age group (χ^2=3.68, p<.055). The Stockholm sample has ten teenagers: nine high school students and one college student. The Tokyo sample, on the other hand, has 11 high school students and nine college students. The reason why Tokyo has a higher percentage of college students in the 16-19 age group is that about a half of college students participated in my study in Tokyo are in the freshman or sophomore years and they are 18- or 19-years old. As I mentioned, Sweden and Japan have different school systems. Swedish college students tend to be older than Japanese college students in general. Many freshman students in Sweden are already in the 20s. The sub-group statistically significant is age by city for

the college student group (χ^2=5.99, p<.050). This one is related to the first one. In the Stockholm sample, there is one teenage college student, eight in the 20s, and one in the 30s, while in the Japanese sample, nine are in the teens and eight are in the 20s.

Although there are some variations between two cities in age and occupation and a significant difference in household types, both cities have identified occupation as a differentiating variable for communication behavior. Age is the second most important demographic variable for the Swedish sample, and household and age are as significant as occupation for the Japanese sample.

The reason why occupation is one of the major differentiating variables is that students have peculiar attitudes and behavior in many areas of communication behavior in both Sweden and Japan, as discussed in previous sections. Housewives in the Japanese sample show interesting patterns in a few items. Age is related to occupation. All teenage respondents are high school or college students in both countries, but some subjects in the 20s are not students. Household is also related to occupation and age, but the reason why household is a strong variable for the Japanese sample is not clear. It may be because Japanese subjects' age, occupation, and household are more aligned with one another than Swedish subjects'. In Japan, all teenagers and eight of 14 people in the 20s are students, and all 11 high school students and six of 17 college students live with their parents and siblings (15 students) or parents alone (two students). Of 17 Japanese college students, nine are in the teens and eight are in the 20s. All nine Swedish high school students live with their parents and siblings (five students) or parents (four students), but none of 12 Swedish college and graduate students lives with their parent or sibling. Of nine college students, only one is in the teens, one in the 30s, and the rest are in the 20s. All three graduate students are in the 20s.

5.2.4.7 Similarities

I have examined and presented the survey and Q-sorts data by answering RQ1 through RQ4. Some of the results are as expected prior to my data collection, but some results are different from my original anticipation in varying degrees. The major surprise to me is that there are a number of differences between the Stockholm and

Tokyo respondents. I was rather expecting that demographic variables would be linked to more variations than cultural differences. I never intend cultural stereotyping, but results show some different trends of m-mail users. Then, what are similarities between two cultures? Although RQ4 mainly asks about differences between the Swedish and Japanese respondents, it is useful to examine similarities between them as well.

Since none of the combined types has exclusively single-country members, there must be some commonality across the countries. Even though the Japanese respondents, on average, send and receive a lot more m-mail messages than their Swedish counterparts, some characteristics seem to be in common. The members of Heavy Voice & Data Users split half and half—ten Swedish and nine Japanese respondents. Almost 20% of the entire sample belongs to this type. It is also interesting to note that The Realistic Majority and Reluctant Users answered more than half of the statements similarly (i.e., the same factor score or less than .5 z score difference). (Refer to Table 4.16: Factor scores of each statement for combined types.) Swedish respondents dominate The Realistic Majority, while most members of Reluctant Users are Japanese males. This pair has more similar answers than any other pairs of respondent type. Reluctant Users and Heavy Voice & Data Users, for example, have similar answers to less than 30% of the statements. Thus, variations by combined type can be more significant than differences between the countries in some aspects.

In order to more clearly and systematically define similarities across the Swedish and Japanese respondents, I use the statements all combined types agreed or disagreed (Table 4.16). There is only one statement that all disagreed: Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime (Statement #23). All combined types agreed with seven statements:

S#1 I socialize with people a lot.

S#3 I talk openly about my personal matters and feelings to my friends.

S#11 I feel comfortable sending personal, intimate messages to my family members or close friends.

S#13 A SMS message from my close friend can please or entertain me even when the content is trivial.

S#14 I send SMS to my friend(s) or family when something good happened to me.

S#33 Paralanguage, such as face symbols (:-) ;-)) and manipulation of special characters (!!!, ???), can add my emotional state to a SMS message being sent.

S#37 Changes in people's lives due to new telecommunications technologies are inevitable.

All statements with positive scores, except S#37, are concerning social interactions and message content. Respondents seem to present themselves as socially active and have good friends to communicate with. They send personal, intimate messages, sometimes using paralanguage, to friends and family.

Many users in both cities realize that they have pleasure, fun, or gratifications by sending m-mail messages. They do not get frustrated because they can say something when they want to say it. They can send a message any time and they get reaction from the recipient quickly. It may be the speed that m-mail users are attracted to. It matches people's busy life style. M-mail also explores and fills the communication area previously nonexistent. Before the advent of m-mail, people probably did not bother to call up someone and say something insignificant. Now users can send m-mail to tell someone about even small things. The sender feels better and satisfied by doing so, and the receiver is pleased to receive a message even with trivial content.

CHAPTER 6: CONCLUSION

A relatively recent phenomenon of m-mail is something we did not see just several years ago. Who would have expected that the mobile phone, a portable telecommunications device designed for voice communication, would have a second and extremely popular usage--sending and receiving text messages? M-mail has expanded the scope of daily interpersonal communication. Part of it never existed before. Such communication may be called ritualistic, trivial, or nonsense, but senders are satisfied with sending something that has just come to their minds, and receivers are pleased to receive messages even when the content itself has no importance to either party. As Jones (1998) asserts, m-mail, as one of many CMC applications, brings efficient social contact. It is not just a tool. Relations occur via m-mail. Reciprocal exchanges create feelings online (Misztal, 2000). And the participation in communication activity is more important than content in ritual communication (Soukup, Buckley, & Robinson, 2001). The m-mail phenomenon suggests that it goes a little further than these CMC theories. Users may recognize somewhere in their minds that they have friends and family who think about them and whom users can contact any time and feel good about it. It may be the psychological connection with other people, rather than convenience and content, that pleases users. Even the most independent person does not want to be alone or isolated from others all the time. People need to belong to a personal social network. A need to belong as a fundamental human motivation (Baumeister and Leary, 1995) or the belonging hypothesis seems to fit in the m-mail phenomenon.

This study has indicated that certain demographic variables and people's types are indeed linked to how often they use m-mail, what kinds of content they exchange, and what they use the medium for. The difference between students and non-students seems to be the greatest differentiator in demographics. When students in the 20s are compared with non-students in the same age group, these two groups appear to be clearly divided in their use of m-mail. Further, high school students seem to use m-mail in various ways such as making friends, ending relationships, and inventing new writing

styles. Older generations, on the other hand, tend to use m-mail in a narrower way. Children in early teens nowadays already own mobile phones. When they get to the high school age in a few years, they might demonstrate wider applications of m-mail. People who were born in the digital age might be able to master any electronic devices as the matter of fact, as if these devices were the users' extended bodies.

Being a student is a special stage of life, when a social network is highly homogeneous and consists of same-age friends. Topics they choose to discuss may be rather limited, compared with topics adults may select to communicate about. Students, within a small community, quickly learn from one another best practices of m-mail. No school student is a beginner because on the day a student gets a mobile phone, he or she knows how to use m-mail. The student has seen how other students use it and even borrowed someone else's mobile phone before. The student community as a whole is adapted for m-mail. This student-led m-mail phenomenon may change if more advanced forms of m-mail are utilized in the business world.

Age is another important factor in m-mail behavior, although this study suggests age is not as strong as occupation (i.e., student or non-student). As a Swedish female interviewee in the 50s suggested, older people's communication habit may be hard to change. Younger people use all kinds of communication methods. They meet each other spontaneously. Older people tend to fix time and location in advance to get together. If this is so, m-mail seems to be contributing to changing styles of meeting arrangements as well. Some of my interviewees who said that m-mail would not have any impact on relationships at least admitted that they could meet their local friends more often because m-mail had made it easier for them to set up a meeting on short notice. Arranging meetings over m-mail is one of the most popular and practical communication many users raised. While content of such messages may be regarded as practical, the act of sending an invitation could be interpreted as a sociable message.

Survey data show contrasts between students and non-students in a variety of items in the questionnaire, while Q-sorting results illustrate differences and similarities between two cultures. The latter was examined through what the types in the Swedish, Japanese, and combined samples indicate. Cultural differences had not clearly surfaced

in my summer 2001 pilot study. A more systematic Q-sorts process made it possible to obtain varying attitudes in two cities. Variance in subjective opinions, self-assessment, and feelings between Stockholm and Tokyo requires more research, as it is likely rooted in the culture, language, history, technology, lifestyle and other dimensions of each country. Possible reasons why more Japanese than Swedes deny m-mail's role in relationship building and maintenance may be found only after more holistic research on these countries

This study has examined m-mail in relation to a few other interpersonal communication modes. M-mail is a text-based messaging system, like e-mail. But at present m-mail and e-mail are different from each other in terms of what kinds of content are exchanged and whom the user communicates with. M-mail is used to send practical and informational messages as well as sociable and emotional messages. But each message is shorter than an average e-mail, and therefore the user must utilize the limited space effectively and economically. Words are abbreviated and sentences get shortened. Users invent telegraphic writing. Many Swedish interviewees compared e-mail to a letter. E-mail is similar to a traditional letter for them. E-mail is more formal and longer than m-mail, requiring more elaboration in each message. An m-mail user typically communicates with his/her selected, close friends and family members via m-mail. On the other hand, e-mail is used for communication with a broader range of people, including individuals and organizations that the user does not know well and friends living overseas.

Communication is considered an integral part of a social life in communication research. In this study, however, many respondents did not think that frequent communication would be always necessary to maintain a good relationship. If frequent communication is not so critical, why do many young people communicate with their friends almost every day through various means of communication channels (i.e., FtF, e-mail, the fixed phone, the mobile phone, and m-mail). Isn't the purpose of frequent communication to maintain amicable and close relationships with friends and/or to maintain family ties? Or is it something else? Students who live in a contained world with a clearly defined social network may perceive that daily communication with the

circle of friends is a norm and nothing special. Users may want to tell something to someone when they want to. In other words, they may use m-mail for their own gratifications.

It must be pointed out that how often one uses m-mail does not always match how the user feels about the medium. A few heavy users of m-mail belong to the Non-believers and Reluctant Users types; that is, some people use m-mail frequently but do not believe m-mail helps them to develop and maintain actual relationships. More research in this area is required to find out exactly why. Here, I would speculate why some people do not believe in the link between m-mail and actual relationships.

When users say that m-mail, which is associated with frequent communication and insignificant content, would not help to enhance actual relationships, do they perceive that a truly good relationship should last without frequent interactions or do they mean that message content should matter? People maintain good relationships without calling or writing to each other frequently, if they share common history, such as childhood neighbors and former classmates. Particularly, when a relationship reaches to a certain level, communication may not have to be as frequent as it was in its earlier stage. Social penetration theory (Altman & Taylor, 1973; Vanlear, 1991) says that social bonds do not grow in a linear, unidirectional path. Some relationships may reach plateaus at some point and start growing again, some may return to an earlier stage, and some may be broken up. As Kerr and Hiltz (1982) suggest, friendship over an electronic network may last longer than friendship developed through direct contact because electronic communication is cheaper and simpler to keep in touch with people.

If kinds of content determine whether the medium helps to maintain relationships, FtF is likely a majority's choice. In a face-to-face interaction, the richest information can be exchanged with the aid of verbal and non-verbal cues. The level of intimacy and immediacy is high when friends meet. Sensitive and emotional topics can be handled in FtF. But people cannot afford to meet friends FtF as often as they want to and they resort to mediated communication. The telephone may be a second choice for many. However, timing is critical for a phone call and therefore this mode may not be feasible all the time.

Does the text mode as a whole prevent people from sending sociable and emotional messages? As CMC literature (for example, Kerr & Hiltz, 1982; Phillips, 1982; Rice & Case, 1983; Steinfield, 1986; Rice & Love, 1987; Hiltz & Turoff, 1993; Walther, 1992, 1996) suggests, interpersonal communication via CMC is not just for practical, task-oriented purposes but also for social and emotional exchanges, particularly when communicators have known each other or have worked together for a long time. Extending this line of argument, I would say that m-mail helps users to form and maintain, and occasionally even end, relationships. Some people say it helps and some people say it does not, as seen in descriptions of the types, but variance in opinion seems to be linked to different views as to how relationships should be maintained, or more specifically, what kind of interactions true friends should make. Even some young users label m-mail as a degraded or less ideal communication mode vis-à-vis FtF and phone interactions. Even though they do not know communication theories such as media richness theory, cuelessness theory, and reduced cue theory, perhaps they remember how they interacted with friends once they were young children having no mobile phones and m-mail. And nobody can tell the consequences in ten or even five years from now.

In a CMC environment, in which users can send and receive messages at their convenient time, is e-mail better suited to convey enriched information than m-mail? The biggest difference between these two for the user is that m-mail is shorter than e-mail. Does the limited length make the user more difficult to send a complex m-mail message? Long-mail services in Japan allow subscribers send longer messages on the mobile phone. Typing on a keypad is not a big problem for many young m-mail users. When higher-capacity services based on 2.5G and 3G wireless networks become more commonplace, there will be little technological difference between m-mail and e-mail. Until such technology becomes ubiquitous, m-mail users probably continue to think that the medium is for small talks. Its specialty is the dialogue style. However, even within a limited space, the users have the liberty to write whatever they feel like. How users want to use m-mail for (i.e., the purpose of the dialogue) and the relationship between the communicators are likely in the most part to determine the content.

This study did not collect actual messages from users due to difficulties in replicating m-mail messages, as explained in the previous chapter. Even if some subjects agree to write down their messages for a researcher, it may be hard for the third party to judge whether those messages are practical, emotional, or sociable ones or not because the same sentence can be used for any of these purposes depending on the context. It may be this potential mismatch between the sender's intention and the receiver's interpretation of a message that may discourage some people from sending emotional messages. More in-depth interviews and ethnographic studies may help to better understand contents of messages in contexts.

If people keep using m-mail-like technology, the direction of m-mail development may be to some extent culture-specific. On the other hand, even reluctant communicators, Non-believers, send a few m-mail messages a day. All people—young and old, and students and non-students--have desire to communicate with others. How they achieve the goal may vary, however. M-mail satisfies some users' communication needs better than others. Rubin, Perse, and Berbato (1988) imply that people engage in interpersonal communication partially because they seek for pleasure. The concept of pleasure consists of entertainment (e.g., fun, a good time, and enjoyment) and arousal (e.g., excitement, thrill, and stimulus). An interaction between two communicators may have no apparent purpose, but they feel they enjoy communicating with each other (Stephenson, 1967).

Technology advances faster than people's communication habits. Younger people are less hesitant to try new consumer devices. High school students, the youngest group of my subjects in this study, are in the best environment, among all demographic groups investigated, for m-mail use. They tend to have a clearly defined circle of friends whom they communicate with almost every day through various means. Many of them have become proficient m-mail users and have expanded the application of this medium. Some users in older generations also feel that m-mail is good for maintaining relationships. M-mail is significant not only because it is convenient and practical but also because it satisfies other needs for many.

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Appendix A

Site Information--Tokyo and Stockholm

Tokyo, Japan

Population: Tokyo is the capital of Japan with about 8 million people in the city and 12 million in the metropolitan area. (Japan's population was 126 million in 1998.)
Population density: 334.6 per sq. km (country average)
Time zone: GMT + 9
Language: The official language is Japanese.
Currency: The Japanese currency is the Yen. As of March 3, 2002, the exchange rate is 133.44 Yen to the dollar (Oanda, 2002).
Climate: Tokyo's climate in summer (June to September) ranges from warm to very hot and humid, while spring and autumn are generally mild. Average July temperature is 25°C or 77°F. It is cold and sunny in winter. Average January temperature is 4°C or 39°F. Rain falls throughout the year, and the main rainy season is from June through early July. Annual rainfall is 62 inches.
Main gateway to Japan: Narita Airport, also known as New Tokyo International Airport, located 41 miles east of central Tokyo, is the main gateway to Japan.
Approximate flight time to Japan: 10 hours (non-stop) from Seattle and other West Coast points to Narita.
Local transportation: Tokyo has one of the most efficient and reliable public transportation systems in the world. Subway, bus, and train services are available to get around in Tokyo. Taxis are numerous and can be hailed on the street, caught at taxi stands, or call for one. Taxi fares are expensive, but no tips to the driver are required.
Electricity: Electricity in Tokyo is 100 volts AC, 50Hz. Plugs are of the flat 2-pin type.

National Holidays in 2002:

Month	Holidays
January	1 - New Year's Day, 14 - Coming-of-Age Day
February	11 - National Foundation Day
March	21 - Vernal Equinox Day
April	29 - Greenery Day
May	3 - Constitution Memorial Day, 5 - Children's Day
July	20 - Day of the Sea
September	15 - Respect-for-the-Aged Day, 23 - Autumnal Equinox Day
October	14 - Sports Day
November	3 - Culture Day, 23 - Labor Thanksgiving Day
December	23 - Emperor's Birthday

(Sources: http://www.worldtravelbuide.net/data/jpn and
http://www.cityguide.travel-guides.com/cities/tok)

Stockholm, Sweden

Population: Stockholm is the capital of Sweden with about 744,000 people in the city and 1.6 million in the metropolitan area. (Sweden's population was 8.9 million in 2000.)

Population density: 19.7 per sq. km (country average)

Time zone: GMT + 1 (GMT + 2 from last Sunday in March to Saturday before last Sunday in October)

Language: The official language is Swedish. The Sami in the north speak Lapp. English is taught as the first foreign language from the age of nine.

Currency: The Swedish currency is the Swedish Kronor (SKr). As of March 3, 2002, the exchange rate is 10.4891 SKr to the dollar (Oanda, 2002).

Climate: Stockholm's climate in summer (June to August) can be hot, while spring and autumn are generally mild. Average July temperature is 18°C or 64.5°F. It is cold in winter. Average January temperature is -2°C or 28.5°F. Rain falls throughout the year. Annual rainfall is 35.5 inches.

Main gateway to Sweden: Arlanda Airport, located 28 miles north of Stockholm, is the main gateway to Sweden.

Approximate flight time to Sweden: From Seattle, 12.5 hours via Copenhagen or 15.5 hours via Newark, NJ to Arlanda.

Local transportation: Subway, bus, and train services are available to get around in Stockholm. Taxis can be ordered by calling a taxi dispatch center.

Electricity: Electricity in Sweden is 220 volts, three-phase AC, 50Hz. Plugs are of the round 2-pin continental type.

National Holidays in 2002:

Month	Holidays
January	1 - New Year's Day, 6 - Epiphany
March	29 - Good Friday
April	1 - Easter Monday
May	1 - Labor Day, 20 - Whit Monday
June	22 - Midsummer Holiday
November	2 - All Saints' Day
December	25 - Christmas Day, 26 - Boxing Day, 31 - New Year's Eve (half day)

(Sources: http://www.worldtravelbuide.net/data/swe and
http://www.cityguide.travel-guides.com/cities/sto)

Appendix B

Interview Guide (Used for the summer 2001 interviews)

The following interview guide was used to ensure consistency of interviews conducted. Depending on the respondent's response, wording of subsequent questions was slightly modified and probing was used, as appropriate. The English version was used for the Swedish respondents, while a Japanese translation was used for the Japanese respondents. All interviewees were using mobile text messaging, which I call "SMS" in this version of interview guide. In Japan, the word "keitai-mail (mobile phone mail)" was used instead of SMS, as keitai-mail has largely replaced short-mail service (the equivalent of SMS) in the country's market.

Question
Q1. How long have you been using the mobile phone?
Q2.a) How long have you been using SMS? **Q2.b)** Have you used a pager (known as "mini-call" in Sweden and "pocket bell" in Japan) to send text-based messages? If so, when and for how long?
Q3.a) How many SMS messages do you send or receive a day on average? And how many of them (or percentage) are to/from your friends or family members? **Q3.b)** How many calls, excluding SMS, do you make or receive a day on your mobile phone? And how many of them (or percentage) are to/from your friends or family members?
Q4. How many calls, excluding Internet access, do you make or receive a day on a fixed telephone (i.e., home phone, office phone, and public pay phone)? And how many of them are to/from your friends or family members?
Q5.a) Do you live with the family members you just mentioned? **Q5.b)** Do you send/receive SMS messages to/from family members or relatives who live at distant locations/cities? If so, how often?
Q6. How often do you see your friends with whom you communicate via SMS? Do you see these friends of yours every day (e.g., Monday through Friday)?
Q7.a) Do you use the PC-based Internet either in your home, school, or at work? **Q7.b)** [If the person has Internet access, continue. If not go to Q8.a.] How many e-mail messages do you send or receive a day on average on the PC?

Question
Q7.c) Are some of these e-mail messages to/from your friends or family? **Q7.d)** How many months/years have you been using the PC-based Internet? **Q7.e)** Do you use the e-mail function on the PC in the same way you use SMS? Or do you differentiate SMS from the Internet e-mail? **Q7.f)** Who else, other than your family and friends, do you communicate with via e-mail on the PC-based Internet?
Q8.a) What were your motives for purchasing the mobile phone? **Q8.b)** Have your initial needs been satisfied? **Q8.c)** Overall, how do you like your mobile phone now?
Q9. The next question is about the text-based messaging function of the mobile phone. What aspects of SMS do you like? Is there anything about SMS you don't like?
Q10.a) Under what circumstances (e.g., location, time, topic and situation) would you use SMS on your mobile phone? Please give me some examples. **Q10.b)** Do you consciously choose a communications mode (e.g., SMS, e-mail, telephone call, face-to-face conversation) according to the location, time, topic and situation? **Q10.c)** Do many of the SMS messages you receive require immediate response? Do you reply to these messages right away? Do you reply to all messages you receive regardless of the content?
Q11.a) What kind of SMS messages or content do you typically send to or receive from your family members? Are they mostly practical ones? Do you send emotional or relationship-maintenance messages? Please give me some examples. **Q11.b)** What kind of SMS messages or content do you typically send to or receive from your friends? Are they mostly practical ones? Do you send emotional or relationship-maintenance messages? Please give me some examples.
Q12.a) Do you use shortened words or phrases in SMS messages? **Q12.b)** Do you use symbols and special characters in SMS messages?

Question
Q13.a) Are most of the people you communicate with via SMS your family members or close friends (i.e., people you know well in your real life)? **Q13.b)** Do you send/receive SMS messages to/from people you know but who are not your family or friends? **Q13.c)** Do you send/receive SMS messages to/from people you have never met face-to-face or talked on the phone? **Q13.d)** Do you have virtual friends, whom you have never met face-to-face or talked on the phone, on the PC-based Internet?
Q14.a) After you got your mobile phone, has the time you spend with your family members for face-to-face conversations and the frequency of such conversations changed? **Q14.b)** Has the time and frequency of making calls to your family members from a fixed phone or a pay phone changed? **Q14.c)** [If a change is detected] Do you think the change is because of the SMS function on the mobile phone? **Q14.d)** What impact do you think SMS has on your relationships with your family members?
Q15.a) After you got your mobile phone, has the time you spend with your friends for face-to-face conversations and the frequency of such conversations changed? **Q15.b)** Has the time and frequency of making calls to your friends from a fixed phone or pay phone changed? **Q15.c)** [If a change is detected] Do you think the change is because of the SMS function on the mobile phone? **Q15.d)** What impact do you think SMS has on your relationships with your friends?
Q16.a) Under what circumstances would you rather talk to your family member or friend on the phone in certain situations (instead of communicating via SMS or Internet e-mail)? **Q16.b)** Under what circumstances would you rather talk to your family member or close friend face-to-face?

Question
Q17. After sending a SMS message to someone, have you ever thought that you should have called or met the person (instead of sending a text-based message)?
Q18. Why do you think some mobile phone users are not using SMS?
Q19.a) What is your average monthly mobile phone bill? And out of the total amount how much is the SMS cost? **Q19.b)** Who pays the bill?
Q20. What is your age group? (16-19, 20s, 30s, 40s, 50s, 60s) **Q21.** Who do you live with? Do all of them have their own mobile phones? **Q22.** What is your occupation?

Appendix C

Summary of Pilot Study Findings

The Use of Mobile Text Messaging: The Japanese and Swedish Cases

Introduction

I conducted interview research in Tokyo and Stockholm in summer 2001. The purpose of my research was to investigate how people in these two cities use text messaging on the mobile phone to communicate with friends and family. I call it m-mail[1] in this report. All the interviews took face-to-face meeting format. I met 17 users (8 males and 9 females) in Tokyo between 12 June and 18 June 2001 and 19 (8 males and 11 females) in Stockholm during the periods 28-30 August and 6-10 September 2001. The respondents' age ranged from 16 to 50+ in both countries.

I highlight similarities and differences between the Japanese and Swedish users, where possible. The objective of this report is to summarize significant findings. Therefore, this report is rather descriptive than analytical.

A. Trends that are Common in Both Countries

1. M-mail pros & cons

a) Pros (not in the order of importance)

- The user can send trivial content to friends without hesitation. The user would

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[1] In Japan, electronic messaging on the mobile phone is generally called "Keitai-Mail," while in Sweden, and in many other countries where GSM (Global System for Mobile Communications) is used as a mobile communication standard, the text messaging service is called SMS (Short Message Service). These are two different technologies.

not call his/her friends to talk about such trivial things, but the user can send this particular type of content to friends via m-mail.

- The user can send m-mail messages without thinking of what the receiver is doing at that particular moment. The user can send late at night, for example, while the other party is sleeping. A phone call would wake this person up, but a text message would not.
- The user can utilize his/her idle time, such as transit time or waiting time, to create and send messages or reply someone.
- M-mail is ideal in situations where the user cannot talk or receive calls, such as in a train, concert hall, restaurant, noisy pub, or meeting.
- M-mail is also good for arranging meetings because a message itself is a note (i.e., written reminder) for the location, date, time, and so on.
- Some people can express themselves better in writing than orally. A mail exchange could become the beginning of a deeper or renewed relationship.
- M-mail could protect users from intimidation or embarrassment. It can be easier and more comfortable to send m-mail than call someone depending on the situation and relationship between the sender and receiver.
- M-mail can be more cost effective than voice calls.
- In m-mail, a sender does not have to go through a greeting protocol or nonessential rhetoric that phone and face-to-face conversations and letters generally require.
- A user can contact someone directly.
- It takes less time to receive a reply, compared with e-mail, because the receiver

carries his/her mobile phone all the time.

- M-mail facilitates frequent communication with friends and family.

b) Cons

- It is troublesome and time-consuming to enter characters through the keypad (much more so than a PC keyboard).
- The maximum number of characters one can send in a message is limited to 250 Japanese characters in Japan, except for long-mail service, and 160 alphabets in Sweden.
- It is difficult to express emotional matters in a short message.
- The user may feel as if he/she could not escape from his/her family and friends because people can contact the user to check on him/her all the time.
- M-mails may not be delivered to the sender right away when there is a problem at the mail center. The sender cannot tell if the addressee has received a message
- The user may get addicted to m-mail.
- Both the screen and keypad are too small for some people.
- M-mail cannot be used for certain business applications. The user can write no more than 250/160 characters nor can attach or open Word/Excel documents.
- It can be costly for heavy data users.

2. When and where users send m-mail messages or access to their m-mail boxes to read messages

a) Location

- Home
- Office

- School (even in class)
- Out of the office or home
    - In public transportation (typically in train)
    - In a concert hall
    - On the street
- Regardless of location

b) Time of day

- During commute time
- During class
- During work hours
- During private time
- In the evening
- Late at night (when the receiver is sleeping)
- Throughout the day or regardless of time
- While waiting for a train or someone
- When there is nothing to do; when the user is bored
- When the message is simple and short
- When the other party's mobile phone is off or could not be reached
- When the user is lonely

c) Surroundings

- When the user is alone
    - In the user's room at home
    - In the user's office at work

- When the user is with other people

  When family members are around at home, colleagues are around at work, or classmates are around in school

  With friends/family in restaurant, coffeehouse, drinking place, etc.

  With strangers in train, concert hall, meeting spots in town, etc.

d) Purpose

- For checking the receiver's schedule, making meeting appointments, and notifying late arrival for an appointment
- For setting up a subsequent voice call (i.e., asking the receiver to call the user or if the user could call the receiver)
- For expecting an immediate reply from the receiver, and for sending an immediate reply to the sender
- Communication for fun
- Free expression of the moment (i.e., to express whatever came to the user's mind)
- To avoid phone conversations (i.e., the user does not like to talk on the phone
- Not to bother the other person by ringing him/her at inconvenient time
- To kill time

3. Message content

a) Content of m-mail messages exchanged with family members

- What time the sender or the receiver comes home
- Location of the user when the user does not or cannot come home at the usual

time

- Whether the sender or the receiver is going to have a dinner at home
- Reports of the day (what happened, weather, etc.)
- Requests such as asking the receiver to get something at a store on his/her way home or make a restaurant reservation
- Information exchange such as a phone number of a restaurant and a name of a song on a TV commercial
- Arranging to go or get together somewhere
- Asking the receiver if he/she is doing OK (e.g., parents living at a distant location are worried about their children)
- "Why don't you send me a mail? I miss your mails."

b) Content of m-mail messages exchanged with friends

- Asking the receiver to see if he/she is available for drinks/dinner/lunch
- Setting the date and location of a meeting
- Notifying late arrival for a meeting or skipping a class
- TV programs such as dramas and baseball games
- Status report on what's happening or what recently happened to the sender
- Information about something the receiver might be interested in (e.g., trips, music, golf, and baseball)
- Requesting something (e.g., a call back)
- The sender's feelings at the moment, but not serious ones
- Emotional support for friends
- Loving, romantic messages

- Speaking ill of a person
- Just "Hello" or "What are you doing?"

4. Circumstances under which phone calls should be used instead of m-mail

- When there is an important or serious thing to talk about
- When emotional feelings must be conveyed, particularly when they are sad or depressed
- When an immediate reply, feedback, reaction is required
- When there is no specific topic but I still want to talk with the person or hear the person's voice for various unspecified topics
- When an unusual or special event occurs
- When a message or conversation is (expected to be) long
- When what to communicate about is complicated (to explain in text)
- When no conclusion has been reached after a number of m-mail exchanges
- When it is troublesome to enter characters (JAPANESE USER ONLY)
- When I have enough time to talk (SWEDISH USER ONLY)
- When people don't check their mobile phones for incoming messages (SWEDISH USER ONLY)
- When I communicate with someone who does not want to use m-mail (SWEDISH USER ONLY)

In general, mobile phone users have been using the fixed phone less frequently or rarely since they started using their mobile phones. They no longer use pay phones.

5. Circumstances under which face-to-face meetings should be used instead of m-mail or phone calls:

- When there is an important or serious thing to talk about
- When emotional feelings must be conveyed
- When the user needs to see the face (i.e., reactions including non-verbal cues) of the other party
- When advice is sought or when there is something to request to the other party
- When the level of seriousness is high
- When there is enough free time, a face-to-face conversation is the best
- When a conversation lasts longer (than a typical phone conversation)
- When the communicators get awkward. (e.g., defending oneself for something he/she did and ending a relationship)
- When an in-depth conversation is needed
- When I simply want to see them (SWEDISH USER ONLY)

6. When the user thought he/she should have called or met the other party instead of sending a message

- When the receiver misunderstood the meaning of the text sent
- When the user was emotional, upset, or in a hurry and sent a message without thinking how the receiver would react to it
- When a message was sent to a wrong person
- When advice is sought, a simple reply via m-mail was not enough (JAPANESE USER ONLY

- After many mails about something have been exchanged and no conclusion has been reached yet (JAPANESE USER ONLY)

Six Japanese and 13 Swedish respondents say that they have never experienced an awkward situation because they don't send serious, sensitive or emotional m-mail messages.

7. Possible reasons why some people do not use m-mail

- Entering characters on a mobile phone is troublesome
- They think calling is less time-consuming
- They think calling is a better method to convey intention
- They do not know how to use the function; no training; computer illiterates
- It is costly to have a mobile phone (and use m-mail). The fixed telephone is enough to satisfy their communication needs.
- It takes time to master how to use it. The procedure varies from model to model.
- They do not like the posture of the teenagers using their thumbs in their mobile phones. (JAPANESE USER ONLY)
- While walking one can talk on the mobile phone but cannot use m-mail. (JAPANESE USER ONLY)
- Their friends cannot use m-mail or they do not know their friends' mail addresses. (JAPANESE USER ONLY)
- Recent crime cases discourage some people from using m-mail. (JAPANESE USER ONLY)
- Older people's communication habits are different from those of younger

people's. (SWEDISH USER ONLY)

- They don't know how convenient it can be because they have never used it. (SWEDISH USER ONLY)

8. M-mail is a different medium than e-mail

The respondents use m-mail differently than PC-based e-mail, if they use e-mail[2]. Since m-mail is used on the mobile phone, it is location independent. M-mail is in most cases used when the fixed-line Internet is inaccessible. But this is just one of many differences. In users' minds, m-mail is more instantaneous, makes them respond quicker (i.e., they respond quicker and they receive replies quicker because people check their mobile phones frequently), and deals with different sorts of content (i.e., simple notes, questions, replies, and trivial messages). A notable technological[3] constraint is the maximum length of a message, which is 250 Japanese characters in Japan and 160 alphabets in Sweden. Some users pointed that m-mail is not suited for business use because of the limitations in capacity and functionality (e.g., inability of attaching files). The largest usability shortcoming is that it takes time to type characters on a small keypad with only a dozen or so buttons, unlike a keyboard of a PC. Another usability issue for

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[2] Some m-mail users do not use e-mail, particularly in Japan.

[3] As noted above, the technologies employed in Japan and Sweden are different from each other. Japan implemented IP-based mobile Internet, which include e-mail and Web browsing, while most mobile phone users in Sweden use Short Message Service (SMS), which is a part of services included in the de fact global mobile communications standard called GSM (Global Standard for Mobile Communications). However, when we look at only the function of text messaging, users in these two countries have almost the same thing.

people in their 50s and older, and certainly those who have problems with their eyesight, raised by a Japanese respondent, is that characters on a small screen are hard to read, even when the screen is color.

All respondents are aware of shortcomings of text-based messaging and use the function when it is convenient to them (e.g., while they are in transit or waiting for someone) or when they think it is better to send a message rather than place a call (e.g., late at night). Users don't send serious or sensitive messages to their friends and family. Rather, they send something trivial, something that they would not bother their friends by calling them. A phone call requires a stronger motivation for the caller because the telephone is more intrusive than electronic messaging. Also, telephone calls generally require more social protocols, such as greetings, than m-mails. Another shortcoming or characteristic that m-mail users are aware is that they cannot convey their feelings well through a short, text-based message. They would rather use the telephone or meet face-to-face when something emotional is involved. Particularly when they are very upset or depressed, they would rather talk on the phone or meet their family or friends instead of using m-mail.

The respondents communicate with their friends more frequently than with their family members or relatives via m-mail. The biggest reason why m-mail exchanges among family members do not take place often is that their parents or spouses do not have mobile phones or use m-mail. This alone indicates that younger people use SMS more than older people. There is little m-mail communication between siblings of the opposite gender in Japan, while a few Swedish respondents communicate with their siblings from time to time.

In general, the people whom a user communicates with via m-mail are the ones the user sees often or those who are psychologically close to the users. Users communicate with only their family and close friends via m-mail. Interestingly, this is not the case with e-mail. E-mail is used, in addition to business correspondence, for communicating with friends living far away geographically (in different time zones) and people whom the user does not know well personally (e.g., school administration staff, bank, customer services in corporations). None of the respondents, except one in Sweden, has virtual friends on m-mail. Several Swedish respondents, however, have virtual friends on the Internet.

M-mail is like a casual conversation. It has an element of turn-taking typical in the traditional human conversations. We all know from our own experience that people sometimes do not reply at all via the phone or e-mail. M-mail seems to be different in this regard. Most respondents have reported that they reply to m-mail messages received (with the exception for one-way broadcasting messages such as newsletters and SPAM) regardless of the content. They make judgment each time they receive a message as to how soon a reply should be returned and in what format (m-mail, e-mail, or voice). The user claims that if he/she did not respond, the sender might wonder if the message has been received and read. The sender does not like when a receiver does not reply within a certain timeframe. So, the user assumes that the sender would feel the same way if he/she did not reply to the sender reasonably soon. It is the receiver's obligation to reply. A few Swedish respondents have commented that SMS is a two-way communication. One Swedish respondent says that she replies to all messages because "they are my friends."

The language used in m-mail is somewhat different from the e-mail language.

M-mail messages are shortened, abbreviated, and truncated. Some words may be omitted. Users try to make each message short so that it takes less time to type and everything can fit within the limited length. This trend is stronger in Sweden. Alphabets may be easier to modify than Japanese characters. E-mail messages are longer and more elaborated than m-mail messages. Surprisingly, special characters, such as smiley, are not used as broadly as one might think. The majority of the respondents (60% in Japan and 74% in Sweden) do not use special characters.

9. Motivation for mobile phone adoption and view of the mobile phone

Motives for purchasing a mobile phone vary from individual to individual, but the bottom line is that everybody wanted to contact people and to be contacted by people for urgent and everyday communication. They wanted a device with which they could communicate anywhere anytime. Some were early adopters (i.e., purchased mobile phones while none of their friends had one), while some were influenced by their friends or siblings to buy mobile phones (i.e., after seeing them use the mobile phone). Some thought it would be cool to have a new electronic device. Some were motivated by emergency situations (e.g., accident and disaster). Some of the teenagers were recommended to have a mobile phone by their parents for security reasons. All respondents' initial needs have been satisfied.

All respondents have positive views about the mobile phone in general. They think that the mobile phone is "good," "convenient," "practical," and "indispensable." A few in both countries express concern over invasion of privacy in the sense that they must take business calls during their free time, although even for them the advantages of the mobile phone outweigh the negative side.

B. Differences Between the Countries

1. Internet experience

Five Japanese respondents who have been using the Internet for two years or less do not use e-mail for personal communication. The Internet access for them is mainly for visiting Web sites. One Japanese respondent does not use the Internet. This means that all electronic messaging these people do for their personal interactions is on their mobile phones. In Sweden, on the other hand, only two respondents do not use e-mail.

2. Pager experience

Five of seven Japanese respondents in their late teens and early 20s had experienced text messaging on the paging system before they purchased mobile phones. No Swedish respondents used pagers with a text messaging capability.

3. Voice calls

Swedish users tend to make more non-business voice calls on the mobile phone as well as on the fixed phone than Japanese users. Nine out of 19 Swedish respondents use their home phones as much to call their family members. Most Japanese respondents do not call from their mobile phones or send m-mails to their family members unless they have something urgent to communicate about. All except one respondent in Japan use m-mail as often as or more often than voice calls on the mobile phone.

For communication with friends, most Japanese respondents either do not use a fixed phone or a pay phone or the frequency of using these types of phones has decreased. Reduction of fixed phone usage seems more moderate in Sweden. Seven Swedish

respondents say there is little change in calling friends from their home phones. All the female high school students (one in Japan and three in Sweden) are the heaviest home phone users. It is probably because costs of the home phone are lower than mobile phone costs. And their parents, not these students, pay home phone bills. (Two of the Swedish high school students pay their mobile phone bills themselves from their second-job wages.)

4. The relationship between m-mails and face-to-face meetings

For most Japanese respondents, the frequency of the user's face-to-face meetings is roughly in proportion to the frequency of m-mail interactions. The more face-to-face meetings, the more m-mail messages the user exchanges, and vice versa. Only one-thirds of the Swedish respondents indicated this trend and the rest have either no patterns or the opposite pattern.

5. Language variations in Japan

Politeness is one of the variations seen in the Japanese language. Wording the Japanese respondents use in m-mail varies, and age or gender does not seem to make a difference. Some users' language in m-mail is more polite than their spoken language. Some use less formal language in m-mail than their spoken language. And yet some do not differentiate between their written language and spoken language.

6. Shortcomings of m-mail

Receiving SPAM is an uncomfortable experience for many Japanese users.

Under a normal mobile subscriber contract, the user must pay for the size of total downloads including SPAM. Content of SPAM itself sometimes makes mobile phone users upset.

Japanese users seem to regard the limitation in message length as a shortcoming but most Swedish users seem to view this as simply a characteristic of SMS and accept it as a fact.

More Japanese respondents than Swedish counterparts claim that their recipients have misunderstood them due to the limitation of text messaging. This may be because the Swedish language is generally more straightforward to communicate simple things in a few short sentences than Japanese.

7. Location where m-mail is used

More Japanese users tend to use m-mail in public transportation systems. In Japan voice calls are socially restricted in public transportation systems, while in Sweden, people make phone calls in trains and buses. Sending and checking m-mail does not make noise and therefore does not bother people around the user.

8. Purpose of m-mail

Related to the above, Japanese users seem to have a strong desire for privacy. They do not want their family members to know about their friends. Some use m-mail to avoid other people from overhearing their voice/conversation when content is sensitive or confidential.

Japanese respondents tend to think that a phone call is intrusive. Many Japanese

users check with the other party by m-mail whether they can call or not before they actually make a phone call.

9. Message content

There is some variance in message content between the two countries. Swedish users exchange loving messages, such as "I love you," and "I miss you," with their family members, while Japanese do not use such direct, intimate expressions as much as Westerners do. With friends, some Swedish respondents exchange jokes or tease each other. Only Japanese male students talk about school reports and homework with their classmates on m-mail.

10. Monthly mobile phone service cost (including voice and data)

The Japanese respondents' monthly mobile phone bills range from 5,000 to 30,000 yen (US$42 to 250), while the Swedish respondents spend 100 to 2,500 Swedish Kronor (SKr) (US$9.50 to 238). In Sweden, prepaid card calling is popular among teenage students. Several of the Swedish respondents use prepaid cards. At least six Swedish respondents spend less than 400 SKr (US$38 or 4,790 yen) a month. The prepaid service is not available in Japan. All Japanese mobile phone users must pay both the basic monthly fee and usage fee to their service providers. The difference in the service options is one of the reasons why the minimum monthly cost in Sweden is lower than the Japanese counterpart. Cost for text messaging is hard to compare. In Sweden, each SMS cost 1.5 SKr regardless of the length (up to the maximum 160 characters) and a receiver is not charged for incoming messages. In Japan, m-mail cost is generally

charged according to the number of bytes transmitted and downloaded and there are many data service billing options available.

C. My Observations about the Use of the Mobile Phone and M-mail

1) All of the users seemed to depend on their mobile phones for their personal communication in varying degrees. Some people, particularly younger ones, report that they must carry their mobile phones with them all the time and that they get panicked or fearful when they have left their mobile phones behind or their mobile phones are unavailable. They depend on the mobile phone for arranging their social life. Older populations, on the other hand, utilize their mobile phones for organizing their daily activities, including work-related ones, effectively and for using their time efficiently.
2) The mobile phone is a private device, but the PC and the telephone are not necessarily so. At work and home, PCs and telephones are shared among the same department (work) and family members (home). The mobile phone provides direct communication between two individuals. M-mail has therefore this same characteristic.
3) The mobile phone is used for convenience of communication for the people on the move—the user can call or send messages anywhere and anytime unless signals are blocked or batteries are out. Main uses are for everyday communication for both contacting people and being contacted. In addition the user has the peace of mind because they think that they can call for help in case of emergency. One of the biggest differences between the mobile phone and the fixed phone is that the mobile phone is

portable and can be carried by the user all the time. The mobile phone and m-mail being mobile makes a difference. Some users also use the mobile phone as a notepad and/or an address book.

4) Adoption of m-mail seems to be dependent on individuals' needs rather than their social status and personal traits.
5) Each user defines his or her own social network by giving out his/her phone number and m-mail address to only the ones he/she likes. E-mail addresses are more public and people give out their e-mail addresses to a larger population and even put them in their business cards.
6) M-mail is positioned as a means to communicate with mainly close friends, as a complementary medium to e-mail and the telephone.
7) M-mail could improve communication between friends as well as between family members. This communication mode emerged in relatively recent years. Part of the m-mail communication presently conducted by users never existed before. For example, individuals did not use their office phones for personal conversations with their friends and family but now they can have private interactions quietly via m-mail during work hours. In other words, m-mail communication expanded the scope of the daily communication activities.
8) Individuals "interact" with the technology and find an optimal solution for them. Some people fully utilize the capabilities of the technology, while some use only a fraction of the function set. For example, some people, particularly older generations, would read incoming messages but rarely write a message.
9) M-mail users get gratifications by sending messages as much as or even more than

receiving messages. They want to express what comes across to their minds and send it to someone they know on the spot.

10) M-mail, like other electronic messaging, shows both instrumental and ritualized patterns of interpersonal communication.

11) Some users are addicted to m-mail. Why do they get hooked even though they know shortcomings of m-mail? They may want to belong to something and maintain ties to a circle of friends.

12) M-mail cannot replace telephone or face-to-face conversations in certain areas, such as discussions of emotional or sensitive topics. But would it change if m-mail becomes capable of handling longer messages with illustrations (i.e., compatible to e-mail) in the future? More research will be required.

Appendix D

Questionnaire #

Questionnaire on SMS
Investigator: Keiko Tanaka

I am a graduate student at the School of Communications, University of Washington in Seattle, U.S.A., where I am doing research on mobile text messaging (SMS) for my doctoral dissertation. Recent growth in the use of SMS is significant, but little research has been done as to how this communication tool might help maintain interpersonal relationships among friends and family members. Your answers to this questionnaire will be useful to understand this field better. Hopefully, it should take less than 20 minutes to complete this questionnaire. The questions asked in this questionnaire are mainly about how often you use SMS, how you communicate with your friends and family, and what you think about SMS. If you do not wish to answer certain questions, you can leave the space blank. Your answers are anonymous. None of my study information will be linked to your identity. I am the only one who will have access to the study information. No portion of the information will be used for any commercial purposes. You will receive a small gift. If any questions in this questionnaire are not clear, please let me know during the survey. Thank you for your participation.

Q1. How long have you been using a mobile phone?
[ ] years [ ] months

Q2.a) How long have you been using SMS?
[ ] years [ ] months

Q2.b) Was SMS the most important reason or one of the reasons why you wanted to have a mobile phone?
[ ] Yes, it was the most important reason
[ ] Yes, it was one of the reasons
[ ] No
[ ] Do not know

Q2.c) Have you ever used a pager (mini-call) ***to send text messages***? If so, when and how long did you use it?
[ ] Yes, I used it from [/] to [/]
year/month year/month
[ ] No, I have never used a pager
[ ] My pager did not have a function to send a text message
[ ] Do not know

Q3. Please estimate frequency of your SMS exchanges and phone conversations (mobile phone and home/office phone) with your friends and family on an average day, and fill the table below. Please exclude business calls. If the number is less than one, please change the unit from "per day" to "per week" or "per month," as appropriate.

		Send	Receive
SMS	Friends	_____	_____per day
	Family/relatives	_____	_____per day
	Other	_____	_____ per day (non-business messages)

		Call	Receive
Mobile phone	Friends	_____	_____per day
	Family/relatives	_____	_____per day
	Other	_____	_____ per day (non-business calls)

		Call	Receive
Home/ office phone	Friends	_____	_____ per day
	Family/relatives	_____	_____ per day
	Other	_____	_____ per day (non-business calls)

Q4. How many different ***people*** (including friends and family) do you communicate with by SMS for personal purposes and how often? Please exclude news, commercial, and SPAM (junk mail) sources, as well as business associates whom you contact for only business purposes. Taking the first line as an example, if you receive more than one message a day from two friends, please write "2" in the brackets. If the number of people is zero, you can either leave the space blank or put "0."

Receive SMS	From how many different people?
More than one message a day	[ ]
2 - 6 messages a week	[ ]
One a week	[ ]
2 - 3 a month	[ ]
One a month	[ ]
Less than one a month	[ ]

Send SMS	To how many different people?
More than one message a day	[ ]
2 - 6 messages a week	[ ]
One a week	[ ]
2 - 3 a month	[ ]
One a month	[ ]
Less than one a month	[ ]

Q5. How often do you see your friends who live, work, or study ***close to*** your home/office/school ***and*** who communicate with you via SMS? How often do you see your family members who live ***close to*** your home but not in the same home ***and*** who communicate with you via SMS? If you do not have family members living outside your home or family members do not use SMS, please leave the space blank.

Frequency of seeing them	Number of friends	Number of family members
5-7 days a week	[ ]	[ ]
2-4 days a week	[ ]	[ ]
Once a week	[ ]	[ ]
A few times a month	[ ]	[ ]
Once a month	[ ]	[ ]
Less than once a month but more than once a quarter	[ ]	[ ]

Q6.a) Do you use the PC-based Internet in your home, friend's home, work, school, or other public locations (e.g., public library and Internet café)?

[ ] Yes [ ] No

Q6.b) [If the answer to Q6.a is "Yes," continue. If the answer is "No," go to Q7.b.] How many e-mail messages do you send to or receive from your friends or family on an average day?

	Send	Receive
Friends	_____	_____per day
Family/relatives	_____	_____per day
Other	_____	_____ per day (non-business messages)

Q6.c) How many months or years have you been using e-mail? E-mail in this question is any computer-based messaging system, and it does not have to be the Internet.

[ ] years [ ] months

Q6.d) Do you have access to the Internet from ***your home***?

[ ] Yes [ ] No

Q7.a) Is your wording in SMS the same as in e-mail if the receiver is the same?

[ ] Yes
[ ] No
[ ] Depends on (specify _____)
[ ] Do not know

Q7.b) Do you try to shorten words, phrases, or sentences when you create a SMS message? Please choose all that apply.

[ ] Yes, all the time
[ ] Yes, sometimes
[ ] Yes, to everybody
[ ] Yes, to some people
[ ] No, not at all

Q7.c) Has your SMS language started to get used in your face-to-face conversations? Please choose all that apply.

[ ] Yes, all the time
[ ] Yes, sometimes
[ ] Yes, to everybody
[ ] Yes, to some people
[ ] No, not at all.

Q7.d) In SMS, do you use words and phrases that have special meanings for only you and the person(s) you are communicating with?

[ ] Yes [ ] No

Q8.a) Do you have virtual friends on SMS (i.e., people you communicate only online and you have never met or talked on the phone)?

[ ] Yes, I currently have
[ ] I used to, but not any more because I stopped communicating with the person(s)
[ ] I used to, but not any more because I eventually met with the person(s) or talked with the person(s) on the phone.
[ ] No, I never had one

Q8.b) Do you have virtual friends you communicate by Internet e-mail only?

[ ] Yes, I currently have
[ ] I used to, but not any more because I stopped communicating with the person(s)
[ ] I used to, but not any more because I eventually met with the person(s) or talked with the person(s) on the phone.
[ ] No, I never had one
[ ] I don't use e-mail

Q8.c) Do you communicate with strangers via chat rooms or instant messaging?

[ ] Yes, often
[ ] Yes, sometimes
[ ] No, not at all

Q9. a) Since you started using SMS, has the time you spend with your ***friends*** for ***face-to-face*** conversations and the frequency of such conversations changed?

[ ] No change
[ ] Changed but not because of SMS
[ ] Increased because of SMS
[ ] Decreased because of SMS
[ ] Increased with some friends and decreased or no change with some friends
[ ] Do not know

Q9.b) Since you started using SMS, has the time you spend with your ***friends*** for ***telephone*** conversations (either on the mobile or regular phone) and the frequency of such conversations changed?

[ ] No change
[ ] Changed but not because of SMS
[ ] Increased because of SMS
[ ] Decreased because of SMS
[ ] Increased with some members and decreased or no change with the rest
[ ] Do not know

Q9.c) Since you started using SMS, has the time you spend with your ***family members*** for ***face-to-face*** conversations and the frequency of such conversations changed?

[ ] No change
[ ] Changed but not because of SMS
[ ] Increased because of SMS
[ ] Decreased because of SMS
[ ] Increased with some members and decreased or no change with the rest
[ ] Do not know

Q10.a) Since you started using SMS, in general, have your relationships with ***existing friends*** changed ***because of SMS***?

[ ] No change
[ ] Improved, became positive, or deepened
[ ] Worsened, became negative or superficial
[ ] Other (Explain _____)
[ ] Do not know

Q10.b) Since you started using SMS, have you made friends with someone or become closer to someone whom you did not know well before (for example, classmates, members of a club/circle/society you belong to) ***through SMS***?

[ ] Yes [ ] No

Q10.c) Have you ever used SMS to end a relationship with someone (regardless of who initiated it, you or your former friend)?

[ ] Yes, I have used SMS to end a relationship (or relationships)
[ ] No, I have not
[ ] Do not know

Q11. Since you started using SMS, in general, have your relationships with your family members changed ***because of SMS***?

[ ] No change
[ ] Improved, became positive, or deepened
[ ] Worsened, became negative or superficial
[ ] Other (Explain _____)
[ ] Do not know

Q12. If you stopped using SMS, do you think you would be able to maintain the same level of intimacy and friendliness with your friends and family whom you currently communicate via SMS?

Friends	Family
[ ] Yes	[ ] Yes
[ ] No	[ ] No
[ ] Depends on the friend	[ ] Depends on the member
[ ] Do not know	[ ] Do not know

Q13. How much do you think you depend on the following for your communication with your friends on an average day? Please circle a number or DK (Don't know) on each line.

	Not at all			A little			Some			A lot			Maximum	
Fixed phone	0	1	2	3	4	5	6	7	8	9	10			DK
e-mail	0	1	2	3	4	5	6	7	8	9	10			DK
face-to-face	0	1	2	3	4	5	6	7	8	9	10			DK
letter/card	0	1	2	3	4	5	6	7	8	9	10			DK
SMS	0	1	2	3	4	5	6	7	8	9	10			DK

Q14. How do you feel about SMS ***psychologically*** while you communicate with your friends or family? Five pairs of adjectives are below. Taking the first pair of words as an example, the extreme left (1) would mean that SMS is very impersonal, 2 is fairly impersonal, 3 is slightly impersonal, 4 is neither nor personal, 5 is slightly personal, 6 is fairly personal, and 7 is very personal. Please circle only one number or DK (Don't know) for each pair.

Impersonal	1	2	3	4	5	6	7	Personal DK
Cold	1	2	3	4	5	6	7	Warm DK
Unnatural	1	2	3	4	5	6	7	Natural DK
Insensitive	1	2	3	4	5	6	7	Sensitive DK
Unsociable	1	2	3	4	5	6	7	Sociable DK

Q15. Which would you enjoy more, sending or receiving SMS messages to/from your friends? (This question is not about frequency, but the level of enjoyment.)

[ ] I enjoy receiving SMS messages more than sending.
[ ] I enjoy sending SMS messages more than receiving.
[ ] I enjoy both receiving and sending SMS messages equally.
[ ] Do not know

Q16. Do you send SMS with content you cannot say on the phone? Choose all that apply.

[ ] Yes to some or all of my friends all the time
[ ] Yes to some or all of my friends sometimes
[ ] Not to my friends because I can say anything to them on the phone
[ ] Yes to some or all of my family members all the time
[ ] Yes to some or all of my family members sometimes
[ ] Not to my family members because I can say anything to them on the phone
[ ] Do not know

Q17. Do you wish to send a message longer than the SMS service currently allows (more than 160 letters), if possible?

[ ] Yes, all the time
[ ] Yes, often
[ ] Yes, sometimes
[ ] Yes, occasionally
[ ] Not at all
[ ] Do not know

Q18.a) Do your friends, whom you communicate by SMS, work or study in the ***same*** work place or school as you?

[ ] Yes, all or most of my friends
[ ] Some friends do, but some do not
[ ] None of them
[ ] Do not know

Q18.b) Do your friends (excluding the ones answered in Q18.a above), whom you communicate by SMS, live, work, or study ***near*** your work, school, or home (so that you could, for example, meet them with a short notice)?

[ ] Yes, all or most of my friends
[ ] Some friends do, but some do not
[ ] No. All are in distant locations
[ ] Do not know

Q19.a) Do you use your friends' or family members' mobile phones to place a call or send a SMS message?

[ ] Yes, all or most of the time
[ ] Yes, sometimes
[ ] Yes, occasionally
[ ] I used to, but no longer
[ ] No, not at all
[ ] Do not know

Q19.b) Do you collaborate with your friends or family to compose a SMS message?

[ ] Yes, all or most of the time
[ ] Yes, sometimes
[ ] Yes, occasionally
[ ] I used to, but no longer
[ ] No, not at all
[ ] Do not know

Q19.c) When you receive or send a SMS message, do you share the content of the message with people around you by reading it aloud or showing the display (screen) to them?

[ ] Yes, all or most of the time
[ ] Yes, sometimes
[ ] Yes, occasionally
[ ] I used to, but no longer
[ ] No, not at all
[ ] Do not know

Q20.a) How much is your monthly mobile phone service cost in total?

_____Swedish Kronor per month on average
[ ] Do not know

Q20.b) Who pays the cost?

[ ] I do
[ ] Parent
[ ] Spouse
[ ] Company or organization
[ ] Other (specify _____)
[ ] Do not know

Q21. What is your gender?

[ ] Male
[ ] Female

Q22. What is your age group?

[ ] 16 - 19 [ ] 20 - 29 [ ] 30 - 39
[ ] 40 - 49 [ ] 50 - 59 [ ] over 60
[ ] I would rather not answer

Q23. Who do you live with? Do they have their own mobile phones? Do they use SMS? Please check appropriate cells.

Live alone [ ] If you live alone, you do not have to fill further.

	Same household	Have mobile phone	Use SMS
grandfather	[ ]	[ ]	[ ]
grandmother	[ ]	[ ]	[ ]
father	[ ]	[ ]	[ ]
mother	[ ]	[ ]	[ ]
brother(s)	[ ]	[ ]	[ ]
sister(s)	[ ]	[ ]	[ ]
son(s)	[ ]	[ ]	[ ]
daughter(s)	[ ]	[ ]	[ ]
grandson(s)	[ ]	[ ]	[ ]
granddaughter(s)	[ ]	[ ]	[ ]
husband	[ ]	[ ]	[ ]
wife	[ ]	[ ]	[ ]
boyfriend	[ ]	[ ]	[ ]
girlfriend	[ ]	[ ]	[ ]
room mate	[ ]	[ ]	[ ]
other (specify _____)	[ ]	[ ]	[ ]

Q24. What is your occupation?

[ ] High school student
[ ] Vocational school student
[ ] College/university student (undergraduate)
[ ] Graduate (Master/Doctoral) student
[ ] Employed full-time in private/public sector
[ ] Employed part-time
[ ] Self-employed; business owner
[ ] Housewife
[ ] Unemployed
[ ] Other (specify _____)

(END OF QUESTIONNAIRE)

THANK YOU FOR YOUR PARTICIPATION.

If you have any questions about this questionnaire or my research, please contact:

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Appendix E

Q-Method Procedure and Q-Sample (Statements for Q-Sorting)

1. Instructions to respondents (to be explained orally at the beginning of a Q-sorting session)

I would like to know what is important to you personally. In front of you, there are 43 statement cards and 9 number cards--marked with a "-4" to a "4" and placed in the ascending order, left to right. On each statement card, you see a statement about SMS use or opinions about interpersonal communication. I would like to know how strongly you agree or disagree to each statement. There is no right or wrong answer. Please use your own judgment. The following is the procedure.

1) Read all the cards to familiarize yourselves with what is written. If you have any questions about words and expressions in these statements, please ask the researcher.

2) Sort the statements into three piles; a) agreeable, b) disagreeable, and c) the remainder (i.e., the statement you are neutral or unsure about).

3) The next step is to rank the agreeable pile from 4 to 1. The number four (4) means that you most agree to the statement on the card, 3, second most agree, and so on. Choose 3 statements that you most agree and place them at #4. Choose 4 statements that you second most agree and place them at #3. Choose 5 statements that you third most agree and place them at #2. Choose 6 statements that you fourth most agree and place them at #1. Place the rest at #0. There should be 18 statement cards in total under #4 through #1. If there are 17 statements or less in the agreeable pile, look at the neutral pile to see if some of them can be placed at #1 or #2.

4) Rank the disagreeable cards from -4 to -1, with -4 being most disagree to the statement on the card, -3 second most disagree, and so on. Like Step 3 above, choose 3 statements that you most disagree and place them at #-4. Choose 4 statements that you second most disagree and place them at #-3. Choose 5 statements that you third most disagree and place them at #-2. Choose 6 statements that you fourth most disagree and place them at #-1. Place the rest at #0. Like the step 3 above, if there are 17 statements or less in the disagreeable pile, look at the neutral pile to see if some of them can be placed at #1 or #2.

5) Look at each card at the neutral pile. If the statements are neutral, the least agreeable, or the least disagreeable to you, place them at #0. At this time, you may switch statements around, as you think appropriate. Use all cards.

6) Before you submit the results to the researcher, please check each pile of cards to ensure you placed the cards in the right positions.

Most disagree				Neutral				Most agree
-4	-3	-2	-1	0	1	2	3	4
3	4	5	6	7	6	5	4	3

Number of statements to place at each number card:

Again, there is no right or wrong answer. Your honest opinions and feelings would be appreciated. The results of this exercise will be anonymous, will not be linked to your identities, and will be kept strictly confidential.

(The researcher will make sure that all the respondents in the session have understood the procedure, and then ask to start. Note that each set of cards has a unique ID on the back of the envelope the set is in. The ID is used to match the results of Q-sorting with the same respondent's survey.)

2. Statements for Q-sorting (43 cards in total)

Each statement is in a separate card so that respondents can shuffle 43 cards. A respondent can start with any card. The numbers in brackets on the cards are randomly selected and are used for the purpose of data recording and entry. The below is the content of the cards. Respondents will not see the categories (in bold).

Social network and socializing activity

1) I socialize with people a lot. [27]

2) Frequent communication is <u>not</u> always required to maintain a good relationship. [59]

3) I talk openly about my personal matters and feelings to my friends. [24]

4) I give my mobile phone number only to the people I like. [85]

5) When I talk, I get conscious, but when I send a text message, I don't. [16]

6) I feel left out when I don't receive any SMS messages for a while. [76]

7) I exchange SMS mostly with people at my age. [53]

8) I exchange SMS mostly with people with the same gender. [36]

9) SMS improves my relationships with friends. [13]

10) SMS improves my relationships with family/relatives. [54]

Intimate content

11) I feel comfortable sending personal, intimate messages to my family members or close friends. [26]

12) SMS is good to have when I feel lonely because I can send messages to my friends for no special reasons. [43]

13) A SMS message from my close friend can please or entertain me even when the content is trivial. [22]

14) I send SMS to my friend(s) or family when something good happened to me. [49]

15) I send SMS to my friend(s) or family to tell them I feel sad or depressed. [31]

16) SMS is useful only for practical, instrumental purposes, and it is not good for conveying emotional feelings. [80]

17) I send instrumental and informational SMS messages (e.g., "I will be late for the meeting" and "His number is 123-4567.") more often than social and emotional messages (e.g., "thinking of you...," and "how are you doing?"). [51]

Interactivity

18) I get frustrated when I don't receive a reply from a person right away after sending a SMS message to that person. [35]

19) It is OK not to reply to an e-mail message as quickly as I do with a SMS message. [29]

Privacy

20) I don't want my family to know whom I communicate with. [99]

21) When I receive a phone call (on a mobile or fixed phone) from my friend or family at inconvenient time, I feel such a call is invasion of privacy. [52]

22) SMS is more private than phone calling because nobody can overhear the voice. [14]

23) Sometimes I feel that my friends and family monitor what I am doing because they can reach me anytime. [12]

Addiction and dependency

24) I feel lost (don't know what to do) when I go out without my mobile phone. [15]

25) It has become one of my habits to constantly check the mobile phone screen to see if a new message has arrived. [19]

Modality

26) People understand me better when I talk to them on the phone than when I communicate with them by SMS. [73]

27) It is easier to express myself by SMS than by face-to-face or phone interactions. [11]

28) Sometimes I am afraid the receiver may misunderstand my SMS message because it is a written message. [94]

29) I like exchanging SMS messages with my friends and family better than talking with them on the phone. [56]

30) SMS is more important than e-mail to me as a personal communication tool. [63]

31) I can understand some friends better through SMS than by talking with them on the phone or face-to-face. [78]

32) I use SMS when I think I might be intimidated or embarrassed if I made a phone call to someone or met the person face-to-face. [23]

Language

33) Paralanguage, such as face symbols (:-) ;-)) and manipulation of special characters (!!!, ???), can add my emotional state to a SMS message being sent. [42]

34) Misspelling and incorrect grammar are tolerated in SMS. [93]

35) It is OK to use a different (for example, more informal and cryptic) language in SMS than e-mail. [67]

Technology

36) Generally, I like to try new technologies before my friends do. [18]

37) Changes in people's lives due to new telecommunications technologies are inevitable (cannot be avoided). [34]

38) I feel that it sometimes takes too much time to type letters through the keypad of the mobile phone. [75]

39) Transmission delay is a serious disadvantage of SMS. [44]

40) SMS is easy enough for anyone, including old people and computer illiterates, to create and send. [81]

41) It is a serious disadvantage not to be able to use (send and receive) SMS. [71]

42) The characters are too small to read on the mobile phone. [57]

43) It was difficult for me to learn how to use (create, send, and read) SMS. [60]

3. Recording

At the end of the Q-sorting session, the researcher or the respondent will write down the statement numbers (i.e., the random numbers in the brackets) in the result sheet. Within the same column, the statement numbers do not have to be written in the ascending or descending order. (For example, if a person selected the statements #13, 36, and 54 as "most disagree," the column can be 36, 54, 13, or any other combinations.) The Q-statement set number in the result sheet must match the ID number at the left upper corner on the first page of the questionnaire the respondent has filled.

Result Sheet

Q set number: ____

-4	-3	-2	-1	0	1	2	3	4

Appendix F

Codebook for Questionnaire

The following scheme, including variable names on SPSS, is used for coding the questionnaire.

Case ID (caseid): 1 to n (n is the sample size)

City (city): Stockholm = 1, Tokyo = 2

Q1. mlong: The number of years and months expressed in decimal (For example, 1.25 for 1 year and 3 months)

Q2.a) longsms: The number of years and months expressed in decimal (For example, 1.25 for 1 year and 3 months)

Q2.b) reason

[1] Yes, it was the most important reason
[2] Yes, it was one of the reasons
[3] No
[99] Do not know

Q2.c) pager

[1] Yes, I used it from [year/month] to [year/month]
[2] No, I have never used a pager
[3] My pager did not have a function to send a text message
[99] Do not know

In a separate column (pagery), enter the number of years expressed in decimals.

Q3. The number of daily messages/calls expressed in numeric numbers (decimal)

Variable name:	
fsmssfr	Number of SMS messages sent to friends
fsmsrfr	Number of SMS messages received from friends
fsmssfa	Number of SMS messages sent to family
fsmsrfa	Number of SMS messages received from family
fsmsso	Number of SMS messages sent to other
fsmsro	Number of SMS messages received from other
fmobsfr	Number of mobile phone calls to friends
fmobrfr	Number of mobile phone calls from friends
fmobsfa	Number of mobile phone calls to family
fmobrfa	Number of mobile phone calls from family
fmobso	Number of mobile phone calls to other
fmobro	Number of mobile phone calls from other
ftelsfr	Number of phone calls to friends

ftelrfr	Number of phone calls from friends
ftelsfa	Number of phone calls to family
ftelrfa	Number of phone calls from family
ftelso	Number of phone calls to other
ftelro	Number of phone calls from other

If frequency is less than one a day, the answer is expressed in decimal (e.g., 0.14 for once a week or 1/7).

Q4. Number of different people communicate by SMS.
Enter the number indicated in the [ ] on each line. Six "receive" columns and six "send" columns.

Variable name:
rsms1 (Receive more than one message a day)
rsms2 (Receive 2 - 6 messages a week)
rsms3 (Receive one a week)
rsms4 (Receive 2 - 3 a month)
rsms5 (Receive one a month)
rsms6 (Receive less than one a month)
ssms1 (Send more than one message a day)
ssms2 (Send 2 - 6 messages a week)
ssms3 (Send one a week)
ssms4 (Send 2 - 3 a month)
ssms5 (Send one a month)
ssms6 (Send less than one a month)

Q5. Frequency of FtF interactions - number of friends.
Enter the number indicated in the [ ] on each line.

Variable name:
ftffr1 (5-7 days a week)
ftffr2 (2-4 days a week)
ftffr3 (Once a week)
ftffr4 (A few times a month)
ftffr5 (Once a month)
ftffr6 (Less than once a month but more than once a quarter)

Frequency of FtF interactions - number of family members.
Enter the number indicated in the [ ] on each line.

Variable name:
ftffa1 (5-7 days a week)
ftffa2 (2-4 days a week)
ftffa3 (Once a week)
ftffa4 (A few times a month)
ftffa5 (Once a month)
ftffa6 (Less than once a month but more than once a quarter)

Q6.a) internet: [1] Yes [2] No

Q6.b) email

Variable name:

fmaisfr	Number of e-mail messages sent to friends
fmairfr	Number of e-mail messages received from friends
fmaisfa	Number of e-mail messages sent to family
fmairfa	Number of e-mail messages received from family
fmaiso	Number of e-mail messages sent to other
fmairo	Number of e-mail messages received from other

If frequency is less than one a day, the answer is expressed in decimal.
Enter 9999 for those who do not use the Internet.

Q6.c) elong: The number of years and months expressed in numeric numbers (2 columns: # years and # months)
Enter 9999 for those who do not use the Internet.

Q6.d) access: [1] Yes [2] No
Enter 9999 for those who do not use the Internet.

Q7.a) word

[1] Yes
[2] No
[3] Depends on something
[99] Do not know

Enter 9999 for those who do not use the Internet.

Q7.b) short - Multiple answers are allowed. Use 2 columns.

[1] Yes, all the time
[2] Yes, sometimes
[3] Yes, to everybody
[4] Yes, to some people
[5] No, not at all

Q7.c) lang - Multiple answers are allowed. Use 2 columns.

[1] Yes, all the time
[2] Yes, sometimes
[3] Yes, to everybody
[4] Yes, to some people
[5] No, not at all.

Q7.d) special: [1] Yes [2] No

Q8.a) virsms

[1] Yes, I currently have
[2] I used to, but not any more because I stopped communicating with the person(s)
[3] I used to, but not any more because I eventually met with the person(s) or talked with the person(s) on the phone.
[4] No, I never had one

Q8.b) virem

[1] Yes, I currently have
[2] I used to, but not any more because I stopped communicating with the person(s)
[3] I used to, but not any more because I eventually met with the person(s) or talked with the person(s) on the phone.
[4] No, I never had one
[5] I don't use e-mail

Q8.c) strang

[1] Yes, often
[2] Yes, sometimes
[3] No, not at all

Q9. a) tftffr

[1] No change
[2] Changed but not because of SMS
[3] Increased because of SMS
[4] Decreased because of SMS
[5] Increased with some friends and decreased or no change with some friends
[99] Do not know

Q9.b) ttelfr

[1] No change
[2] Changed but not because of SMS
[3] Increased because of SMS
[4] Decreased because of SMS
[5] Increased with some members and decreased or no change with the rest
[99] Do not know

Q9.c) tftffa

[1] No change
[2] Changed but not because of SMS
[3] Increased because of SMS
[4] Decreased because of SMS
[5] Increased with some members and decreased or no change with the rest
[99] Do not know

Q10.a) chgfr

[1] No change
[2] Improved, became positive, or deepened
[3] Worsened, became negative or superficial
[4] Other
[99] Do not know

Q10.b) newfr [1] Yes [2] No

Q10.c) end

[1] Yes
[2] No
[99] Do not know

Q11. chgfa

[1] No change
[2] Improved, became positive, or deepened
[3] Worsened, became negative or superficial
[4] Other
[99] Do not know

Q12. stopfr

[1] Yes
[2] No
[3] Depends on the friend
[99] Do not know

stopfa

[1] Yes
[2] No
[3] Depends on the family member
[99] Do not know
[9] Not applicable (do not use SMS to communicate with family)

Q13. Degree of dependence on communication method.
Enter the circled number or 99 for DK.

Variable name:
deptel (Fixed phone)
depema (e-mail)
depftf (ace-to-face)
deplet (letter/card)
depsms (SMS)

Q14. Psychological effects of SMS.
Enter the circled number or 99 for DK.

Variable name:
persona (Impersonal Personal)
warm (Cold Warm)
natural (Unnatural Natural)
sensi (Insensitive Sensitive)
social (Unsociable Sociable)

Q15. enjoy

[1] I enjoy receiving SMS messages more than sending.
[2] I enjoy sending SMS messages more than receiving.
[3] I enjoy both receiving and sending SMS messages equally.
[99] Do not know

Q16. say - Multiple answers are allowed. Use 2 columns.

[1] Yes to some or all of my friends all the time
[2] Yes to some or all of my friends sometimes
[3] Not to my friends because I can say anything to them on the phone
[4] Yes to some or all of my family members all the time
[5] Yes to some or all of my family members sometimes
[6] Not to my family members because I can say anything to them on the phone
[99] Do not know

Q17. longer

[1] Yes, all the time
[2] Yes, often
[3] Yes, sometimes
[4] Yes, occasionally
[5] Not at all
[99] Do not know

Q18.a) same

[1] Yes, all or most of my friends
[2] Some friends do, but some do not
[3] None of them
[99] Do not know

Q18.b) near

[1] Yes, all or most of my friends
[2] Some friends do, but some do not
[3] No. All are in distant locations
[99] Do not know

Q19.a) borrow

[1] Yes, all or most of the time
[2] Yes, sometimes
[3] Yes, occasionally
[4] I used to, but no longer
[5] No, not at all
[99] Do not know

Q19.b) collab

[1] Yes, all or most of the time
[2] Yes, sometimes
[3] Yes, occasionally
[4] I used to, but no longer
[5] No, not at all
[99] Do not know

Q19.c) share

[1] Yes, all or most of the time
[2] Yes, sometimes
[3] Yes, occasionally
[4] I used to, but no longer
[5] No, not at all
[99] Do not know

Q20.a) cost: Enter the SEK or Yen value. 99 for DK.
currency: 1 for Swedish Kronor and 2 for Japanese Yen

Q20.b) pay

[1] I do
[2] Parent
[3] Spouse
[4] Company or organization
[5] Other
[99] Do not know

Q21. gender: [1] Male [2] Female

Q22. age

[1] 16 - 19 [2] 20 - 29 [3] 30 - 39
[4] 40 - 49 [5] 50 - 59 [6] over 60
[99] I would rather not answer

Q23. live (Same household), have (Have mobile phone), use (Use SMS).
List up to 5 family members for each case (variable name: live1 to live5, have1 to have5, and use1 to use5).

1. alone	2. grandfather	3. grandmother	4. father	5. mother
6. brother(s)	7. sister(s)	8. son(s)	9. daughter(s)	10. grandson(s)
11. granddaughter(s)		12. husband	13. wife	14. boyfriend
15.girlfriend	16. room mate	17. other		

Q24. job

[1] High school student
[2] Vocational school student
[3] College/university student (undergraduate)
[4] Graduate (Master/Doctoral) student
[5] Employed full-time in private/public sector
[6] Employed part-time
[7] Self-employed; business owner
[8] Housewife
[9] Unemployed
[10] Other

Use 999 to imply "no answer" throughout the survey.

Appendix G

Q Factor Analysis

The following three tables (Tables G1, G2 and G3) show respondent IDs and their factor loadings. The types are identified for the Swedish, Japanese, and combined samples respectively. The respondent IDs have been constructed so that each ID can tell certain demographic characteristics of that respondent. The first two digits are usually the order I met, the following two characters represent Sweden (SW) or Japan (JP), followed by age group (1 for the teens, 2 for the 20s, 3 for the 30s, 4 for the 30s, and 5 for the 50s) and gender (M for male and F for female). Some have Hs, Cs, or Gs at the end of their IDs. The H means that the person is a high school student, C, a college student, and G, a graduate student.

Table G1: Q Factor Analysis of Swedish Respondents—Factor Loadings

Respondent ID	Factor 1 Practical Users	Factor 2 Young Social Networkers	Factor 3 Veteran E-mail Users	Factor 4 Heavy Female Users	Composite reliability
34SW1MH	0.7552				0.978
16SW4F	0.6770				
36SW5M	0.6763				
20SW2FG	0.6383				
10SW2FC	0.6350				
09SW3MC	0.6280				
07SW2MG	0.6180				
24SW2M	0.6064				
21SW2F	0.5976				
17SW3M	0.5123				
40SW5M	0.4427				
05SW2MC		0.7287			0.973
14SW1FH		0.7093			
13SW1FH		0.6856			
02SW2FC		0.6592			
19SW3M		0.6007			
12SW2M		0.5851			
32SW1MH		0.5798			
01SW2MC		0.5734			
18SW3M		0.4324			
35SW1MH			0.7077		0.970
25SW2FC			0.7075		
30SW3F			0.6905		
22SW3M			0.6716		
03SW2MC			0.6094		
15SW1FH			0.5962		
27SW5M			0.5634		
28SW4M			0.5405		
26SW5F				0.7554	0.941
29SW4F				0.6652	
11SW1FH				0.6090	
31SW1FH				0.5131	

The number of respondents accounted for is:

Factor 1: 11 (27.5% of Swedish sample)
Factor 2: 9 (22.5%)
Factor 3: 8 (20.0%)
Factor 4: 4 (10.0%)

In this table, 32 (80.0%) of 40 Swedish respondents are accounted for.

The correlation coefficients among these four factors are as follows:

Swedish factors

	1	2	3	4
1	1.0000	0.6376	0.4928	0.3157
2	0.6376	1.0000	0.5851	0.4220
3	0.4928	0.5851	1.0000	0.3991
4	0.3157	0.4220	0.3991	1.0000

Correlation between the SW Factor 1 (Practical Users) and SW Factor 2 (Young Social Networkers) seems a little high. When all 96 subjects are combined and factor analyzed, the majority of these two factors go to the Combined Factor 1, The Realistic Majority (Table G3).

Table G2: Q Factor Analysis of Japanese Respondents—Factor Loadings

Respondent ID	Factor 1 Non-believers	Factor 2 Emotional Users	Factor 3 Student-like Users	Factor 4 Reserved Writers	Comp. Rel.
49JP3M	0.7919				0.986
51JP3M	0.7106				
55JP2M	0.6965				
34JP4M	0.6407				
15JP1MC	0.6232				
53JP4M	0.6126				
44JP2MC	0.6020				
52JP3M	0.5758				
38JP5F	0.5756				
18JP1MH	0.5739				
17JP5M	0.5706				
29JP5M	0.5647				
56JP2M	0.5497				
24JP3F	0.5115				
08JP1FC	0.5103				
25JP3F	0.4757				
31JP4F	0.4410				
36JP4M	0.3978				
06JP1FH		0.7532			0.981
07JP1FC		0.6666			
39JP2FC		0.6616			
47JP2F		0.6331			
50JP3M		0.5869			
23JP3F		0.5642			
43JP2MC		0.5532			
09JP1MC		0.5344			
32JP4F		0.5007			
03JP1FH		0.4595			
02JP1FH		0.4230			
33JP5F		0.4071			
12JP1MC		-0.5715			
40JP2FC			0.7050		0.970
42JP2FC			0.6866		
54JP2M			0.6639		
19JP1MH			0.6561		
04JP1FH			0.5925		
10JP1MC			0.5919		
05JP1FH			0.5793		
48JP2F			0.5417		
37JP4M				0.6761	0.966
11JP1MC				0.6413	
46JP4F				0.6355	
16JP1MC				0.5224	
13JP1MC				0.4673	
45JP2FC				0.3587	
21JP1MH				0.3514	

The number of respondents accounted for is:

Factor 1: 18 (32.1% of Japanese sample)
Factor 2: 13 (23.2%)
Factor 3: 8 (14.3%)
Factor 4: 7 (12.5%)

In this table, 46 (82.1%) of 56 Japanese respondents are accounted for.

The second factor in this table (Emotional Users) has one negative loading value (-0.5715). By comparing the Q distributions of this subject (12JP1MC) with these of the rest of the members in the Factor 2, it appears that this particular subject, a teenage male college student, chose some distinguishing statements for the Factor 2 in the way almost opposite to the rest did. Where this subject chose a statement negative, the rest of the factor thought it positive, and vice versa. In other words, this subject showed the reversal of the Japanese Factor 2 characteristics in his Q-sorts.

The correlation coefficients among the four Japanese factors are lower than those of the Swedish factors, as below:

Japanese factors

	1	2	3	4
1	1.0000	0.3543	0.2747	0.1526
2	0.3543	1.0000	0.4979	0.3514
3	0.2747	0.4979	1.0000	0.3656
4	0.1526	0.3514	0.3656	1.0000

When the Swedish and Japanese samples are combined as a third data set, the following is the result.

Table G3: Q Factor Analysis of Combined Sample—Factor Loadings

Respondent ID	Factor 1 Realistic Majority	Factor 2 Heavy Voice & Data Users	Factor 3 Reluctant Users	Factor 4 Text Messaging Lovers	Factor 5 Confident Infrequent Users	Comp. Rel.
34SW1MH	0.8395					0.987
20SW2FG	0.7386					
36SW5M	0.7143					
13SW1FH	0.6612					
08SW2FC	0.6580					
04SW1FC	0.6378					
21SW2F	0.6234					
10SW2FC	0.6009					
32SW1MH	0.5616					
16SW4F	0.5439					
14SW1FH	0.5238					
12SW2M	0.5102					
17SW3M	0.5127					
09SW3MC	0.5092					
25JP3F	0.4979					
07JP1FC	0.4587					
18SW3M	0.4566					
39SW5M	0.4332					
08JP1FC	0.4044					
11SW1FH		0.7082				0.987
33SW1MH		0.6499				
47JP2F		0.6078				
30SW3F		0.5913				
28SW4M		0.5904				
09JP1MC		0.5839				
20JP1MH		0.5832				
39JP2FC		0.5715				
06SW2FC		0.5553				
37SW3F		0.5508				
35SW1MH		0.5401				
37JP4M		0.5300				
31SW1FH		0.5238				
22JP1MH		0.5018				
33JP5F		0.4988				
02JP1FH		0.4933				
26SW5F		0.4594				
21JP1MH		0.4396				
29SW4F		0.4123				

(to be continued to the next page)

Respondent ID	Factor 1 Realistic Majority	Factor 2 Heavy Voice & Data Users	Factor 3 Reluctant Users	Factor 4 Text Messaging Lovers	Factor 5 Confident Infrequent Users	Comp. Rel.
51JP3M			0.6854			0.985
18JP1MH			0.6482			
44JP2MC			0.6360			
49JP3M			0.6256			
34JP4M			0.6023			
05JP1FH			0.5934			
24SW2M			0.5864			
52JP3M			0.5475			
15JP1MC			0.5465			
53JP4M			0.5055			
31JP4F			0.5043			
14JP2MC			0.4991			
12JP1MC			0.4802			
36JP4M			0.4531			
24JP3F			0.4484			
56JP2M			0.4306			
42JP2FC				0.7534		0.976
54JP2M				0.6778		
19JP1MH				0.6501		
04JP1FH				0.6156		
40JP2FC				0.6129		
13JP1MC				0.5800		
41JP2FC				0.5784		
48JP2F				0.5432		
15SW1FH				0.5304		
45JP2FC				0.3618		
38SW5F					0.7554	0.923
35JP4F					0.6834	
26JP3F					0.5549	

The number of respondents accounted for are:

Factor 1: 19 (19.8% of total sample)
Factor 2: 19 (19.8%)
Factor 3: 16 (16.7%)
Factor 4: 10 (10.4%)
Factor 5: 3 (3.1%)

In this table, 67 (69.8%) of 96 respondents are accounted for. Although the Combined Factor 5 (Confident Infrequent Users) has only three people, it appears these three people have a distinct set of characteristics.

The correlation coefficients among the combined factors are as below:

Combined factors

	1	2	3	4	5
1	1.0000	0.4882	0.5480	0.3321	0.3123
2	0.4882	1.0000	0.3591	0.5094	0.1422
3	0.5480	0.3591	1.0000	0.2356	0.2671
4	0.3321	0.5094	0.2356	1.0000	0.1534
5	0.3123	0.1422	0.2671	0.1534	1.0000

VITA

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Papers presented at conferences:

May 2000	WAPOR (The World Association for Public Opinion Research) 2000 in Portland, OR "Public Opinion of the WTO" (Group paper) (Co-authors: Cathy Bullock, Michael McCluskey, Catherine Scott, Keith Stamm, and Marcos Torres)
July 2000	INET2000 in Yokohama, Japan "Motion Picture on the Net: Streaming Media Industry, Technology, and Early Adopters"
May 2001	ICA (International Communication Association) in Washington, D.C. "Knowledge or Trust? Investing Linkages between Media Use and Political Participation" (Group paper) (Co-authors: Patricia Moy, Marcos Torres, and Michael McCluskey)
July 2001	IEEE (The Institute of Electrical and Electronics Engineers) History of Telecommunications Conference in St. John's, Newfoundland, Canada "The Mobile Communications Environment in the European Union: Systems, Regulations, and Consequences" First place in the graduate student paper competition
Sept. 2001	WAPOR 2001 in Rome, Italy "American and Japanese Newspapers' Framing of the Greeneville Incident"

Nov. 2002 MAPOR (Midwest Association for Public Opinion Research) 2002 in Chicago, IL
"The Protest Paradigm and the WTO: Media Portrayals of Public Opinion" (Group paper)
(Co-authors: Patricia Moy, Michael McCluskey, and Marcos Torres)

Papers published:

Sept. 2001 *Pacific Northwest Quarterly*, Vol. 92, No. 4 (pp.190-202)
"Early Telephone Use in Seattle, 1880s-1920s"

Nov. 2002 *Mass Communication & Society*, Vol. 5, No. 4 (pp. 449-466)
"Group Affiliations, Opinion Polarization, and Global Organizations: Views of the WTO Before and After Seattle" (Group paper)
(Co-authors: Cathy F. Bullock, Michael McCluskey, Keith Stamm, Marcos Torres, and Catherine Scott, and Marcos Torres)