

# **Navigating Expansive Social Horizons: the Social Utility of Mobile Phone E- mail among Japanese Youth**

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## **Abstract**

*Research on the social implications of mobile phone e-mail for Japanese youth tends to focus on how these young people use mobile phone e-mail to cocoon into small circles friends and avoid social control imposed by parents, teachers, and other figures of authority. While this no doubt happens, socio-emotional selectivity theory suggests youth are increasingly motivated develop new peer relationships that act as new sources of knowledge. Mobile phone e-mail may allow Japanese youth the opportunity to more actively navigate these increasingly large and complex networks. Using this theory we hypothesize that frequency of mobile phone e-mail increases with age, personal network size, and network complexity. To examine these hypotheses we draw on survey data collected from 1,317 youth aged 8 - 16 years living in Tokyo, Japan. Our multivariate analysis shows strong positive influence of age and network size on mobile phone e-mail use. Network complexity -- operationalized as connecting to peers in a variety of social settings, through involvement in multiple clubs and other extracurricular activities -- was not significantly associated with frequent use of mobile phone e-mail. When taken together these findings show that rather than limiting social horizons, mobile phone e-mail plays a significant role in the lives of young Japanese by affording them the opportunity to navigate large social networks as they mature.*

Japanese youth have been among the earliest and heaviest adopters of mobile phone e-mail in the world. What motivates them to use this technology and what does it mean for their social relationships? Addressing this question a handful of studies based mostly on participant observation and in-depth interviews have examined how and why mobile phones are used among Japanese youth. These studies have generally found that Japanese youth use mobile phone e-mail to bond with peers in a way that thwarts adult control. They also find that mobile phones are used as a fashion accessory and imbued with personal identity.

This study explains the use of mobile phone e-mail among Japanese youth somewhat differently, both in terms of theoretical focus and methodological approach. Theoretically, rather than focusing on social control, it draws on personal network analysis and socio-emotional selectivity theory to explain this behavior as a strategy maintaining large and complex networks at a time of increasing cognitive development. Methodologically, rather than studying a small set of individuals, we draws on survey data collected from a representative sample of Tokyo youth to find tendencies that are generalizable to this population. Using these different theoretical and methodological approaches provides a somewhat different, although not completely contradictory, view of why Japanese youth are such heavy users of mobile phone e-mail. Unlike many studies we find that mobile phone e-mail is used more to maintain large personal networks than it is to cocoon with a small groups of friends. However, like a majority of studies, we find that mobile phone e-mail is vital to the maintenance of peer relationships, and it is quite

possible subversion of adult control is a necessary means of maintaining these relationships. Thus, although our findings differ somewhat concerning the role of mobile phone e-mail in maintaining large peer networks, our explanation of these findings by way of socio-emotional selectivity theory differs mostly in terms of focus.

In the section that follows we review in greater detail existing literature on the use of mobile phone e-mail among youth in Japan and in other parts of the world.

### **The Use of Mobile Phone E-mail During Adolescence -- An International Perspective**

The diffusion of internet-enabled mobile phones occurred quickly in Japan. Within four years the number of mobile phone Internet subscribers in Japan increased ten times, from 7.5 million in 2001 to 75 million in 2005. While internet enabled mobile phones typically offer the opportunity to carry out a variety of activities online, such as downloading maps, ring tone music, or sending photos, Japanese subscribers most commonly use their mobile phone to send and receive e-mail (Ministry of Public Management, Home Affairs, Posts and Telecommunications, 2003). According to a highly regarded report published by the Japanese Ministry of Internal Affairs and Communications (2005), approximately 88 percent of Japan's 87 million mobile phone subscribers use their mobile phones to send and receive e-mail.

Mobile phone e-mail is functionally similar to SMS (Short Message Services) available in other countries, insofar as it enables people to exchange messages directly from one mobile phone to another. However, e-mail enabled mobile phones further allow users to exchange e-mail messages with PC based e-mail accounts, while this function is not inherent to mobile phone SMS. Despite this added functionality, mobile phone e-mail is typically only exchanged from one mobile phone to another in Japan. This is especially true among young Japanese, who are among the heaviest users of mobile phones (Ikeda et al., 2005; Miyata et al., 2005). Thus, despite the technical differences between mobile phone e-mail and mobile phone SMS, both services are used in very similar ways.

The early and rapid adoption of mobile phone e-mail by Japanese youth has been a source of fascination for both scholars and the popular media. Explanations regarding the heavy use of mobile phones in Japan have sometimes focused on supposedly unique aspects of Japanese culture, such as the high disclosure of the subjective self that may be facilitated through mobile phone texting (Iishi, 2006). Unfortunately, these kinds of cultural generalizations are rarely supported by nationally representative data that has been collected in multiple countries (although see Rivière and Licoppe, 2005). Our literature review shows that although Japan may be somewhat unique in its history of mobile phone diffusion, Japanese adolescents are quite similar to adolescents in other developed countries regarding their use of mobile phones.

One of the most prevalent themes emerging from research in developed countries is the tendency of adolescents to send text messages using mobile phone SMS or e-mail, rather than making calls like adults (Lenhart et al., 2005). Even in America where adolescents often used PC based IM instead mobile phone texting, American adolescents have recently started to supplement their IM habits with mobile phone based text messages (Ling and Baron, 2007). This shows that even though Japanese adolescents were among the first of their kind to incorporate mobile phone text messaging into their lives, adolescents in other countries have followed suit.

Research conducted in Japan, America, and many parts of Europe also shows that adolescents typically use mobile phone text messages in similar ways and for similar reasons. One of the most common research findings is that adolescents use mobile phone text messages to bond closely with their friends by using them express a range of emotions that helps them maintain a strong sense of connection (Döring et al., 2005, in Germany; Furutani and Sakata, 2007, in Japan; Höflich and Rössler, 2002, in Germany; Ito and Okabe, 2005, in Japan; Kasesniemi and Rautiainen, 2002, in Finland; Kobayashi and Ikeda, 2007, in Japan; Ling, 2005, in Norway; Ling and Yttri, 2005, in Norway; Lobet-Maris and Henin, 2002, in Belgium; Matsuda, 2000, in Japan; Nakamura, 2001, in Japan; Oksman and Rautiainen, 2002, in Finland; Selian, 2004, in America; Thurlow and Brown, 2003, in America). These messages are often sent in situations where a call would be impossible or unsuitable, making mobile phones the “back door of communication” (Kasesniemi and Rautiainen, 2002, p. 171). Using mobile phones to covertly send messages provides new freedom for adolescents, helping them to subvert control imposed by parents, teachers, and other authority figures (Ito and Okabe, 2005, in Japan; Fortunati and Magnanelli, 2002, in Italy; Ling 2000, 2002, 2005, in Norway; Ling and Yttri, 2005, in Norway). This subversion of authority helps adolescents maintain a sense of independence that is crucial to the process of identity formation (Ling, 2002, in Norway; Mante and Piris, 2002, in the Netherlands; Selwyn, 2003, in Britain; Ito, 2005, in Japan). Being available for contact at all times throughout the day also helps maintain a sense of connection when communication is not occurring (Höflich and Rössler, 2002, in Germany; Ito and Okabe, 2005, in Japan; Leung and Wei, 2000, in Hong Kong; Ling, 2000, in Norway).

Although the use of mobile phones to bond with peers has been a common finding of research conducted in many developed countries, still other reasons for mobile phone use during adolescence exist. Research has also shown that adolescents personalize their mobile phones by adding icons or external decoration. This helps them display their personal identity and incorporate mobile phones into their daily lives (Fujimoto, 2005, in Japan; Katz & Sugiyama, 2005, in America; Ling, 2002, in Norway; Lobet-Maris & Henin, 2002, in Belgium). This level of personalization has also been argued to reflect the consumption patterns of fashion conscious adolescents, especially young women (Wilska, 2003, in Finland).

The combination of social and nonsocial factors used by researchers to explain the heavy integration of mobile phones by adolescents throughout the world indicates that this technology has become domesticated by adolescents such that it fits into common social dynamics of distance, power, status and identity (Kato, 2005, in Japan; Katz & Sugiyama, 2005, in America; Ling, 2001, in Norway). This points to the possibility that despite cultural differences, adolescents in many different countries use mobile phones in similar ways due to their common situations, i.e. their desire to bond closely with peers and form identity at a time when school and family obligations act to limit their autonomy.

Rather than focusing on issues of social control and social cocooning with small peer groups, we examine peer relationships during adolescence to help explain the intense use of mobile phones. Drawing on socio-emotional selectivity theory, we suspect that the social exploration enabled through increasing cognitive development adolescence motivates youth to use mobile phone e-mail as a means of maintaining large and complex personal networks. Given that these cognitive abilities are constantly increasing during adolescence, we further suspect that the frequency of mobile phone e-mail use increases throughout the transition into adulthood. The next section draws on socio-emotional selectivity theory to explore this alternative argument in great depth.

### **Socio-Emotional Selectivity Theory and Mobile Phone E-mail Use During Adolescents**

The theory of socio-emotional selectivity posits that social tendencies are strongly tied to perception of time. The closer that individuals draw towards the end of their lives, the more they perceive of time as being limited. Accordingly, they tend to maintain strong relationships that provide constant emotional satisfactions at the expense of forming weaker relationships that could act as new sources of knowledge. By contrast, perception of time before adulthood is more open-ended, and for this reason young people tend to place greater weight on developing new relationships that are more likely to yield new sets of knowledge than provide consistent emotional satisfaction. Along with having a more open-ended perception of time, the cognitive development that occurs naturally as young people move into adolescence helps them increasingly maintain large and complex networks.

Literature focusing on the kinds of personal networks maintained by young people confirms that their networks tend to be fluid and complex. For example, in a longitudinal study by Degirmencioglu et al. (1998) junior high school and high school students were asked to nominate up to 10 of their closest friends at the beginning and end of the school year. They found that best friends nominated at the beginning of the year were also nominated as either best or at least close friends at the end of the year. However, less close friends nominated at the beginning of the year were far less likely to be renominated by the end of year, at which point students instead nominated new friends. These results suggest that adolescents maintain a stable network of strong ties while at the same time forming and breaking

relationships with weaker ties. Another study measuring relationships during the fall and spring of a school year found similar results concerning the stability of strong ties among first and fourth grade students (Berndt and Hoyle, 1985). Changes to social networks also occur during shorter periods of time throughout the school year, even among strong ties. When tracking pairs of relationships over a three week period, Cairns et al. (1995) showed that less than half of the pairs who mutually nominated each other as best friends at Time 1 again nominated each other as best friends just three weeks later at Time 2. Similar findings have been observed regarding the social networks of Japanese adolescents (Toya, 1996; Oka 1999).

Given that young people tend to maintain relatively large and fluid networks and they are also among the heaviest users of mobile phone e-mail, there is reason to believe that maintaining these kinds of personal networks may motivate the use of mobile phone e-mail. Indeed, evidence supporting this conjecture has already been garnered from a study of students in Tokyo who recently made the transition to high school. In this study Boase and Kobayashi (2008) find that both maintaining strong relationships and developing new relationships are positively associated with the use of mobile phone e-mail. However, the find that building new relationships is more fundamentally associated with sending mobile phone e-mail than bonding with existing relationships. Although this is a positive first step to confirming that mobile phone e-mail is an important tool for social exploration during youth, the study was limited in a few ways. First, all the respondents in the study were approximately the same age at the time of the study. Since socio-emotional selectivity theory indicates that social exploration should increase throughout the transition to adolescence, studying young people of several ages would be more informative. Second, by focusing on perceptions about the use of mobile phone e-mail for bonding and bridging with social ties, the study did not examine the role of mobile phone e-mail in maintaining large and complex personal networks that may also be the result of social exploration.

In this paper we draw on socio-emotional selectivity theory to make the following three hypothesis. First, young people use mobile phone e-mail a tool for navigating relatively large and fluid networks that are the result of social exploration. Thus, we hypothesize that:

1. As personal network size increases, the frequency of sending mobile phone e-mail increases.

Second, mobile phone e-mail may also be used to manage network complexity that results in forming relationships with peers from different social groups. With this definition of network complexity in mind, we hypothesize that:

2. As personal network complexity increases, the frequency of sending mobile phone e-mail increases.

Third, because social exploration is continually increasing as young people transition into adolescence, we suspect that mobile phone e-mail may help to facilitate this exploration. Rather than focus on age

directly we instead focus on grade attended, because socio-emotional selectivity theory stresses that life stage in regard to others in similar social groups is more important than actual age. Accordingly, hypothesize that:

3. As grade increases, the frequency of sending mobile phone e-mail increases.

### **Data Collection and Key Variables Operationalization**

To examine our hypotheses we draw on survey data collected February of 2008 from 1,317 youth aged 8 - 16 years living in the greater Tokyo area (Tokyo, Chiba, Kanagawa). The sample was drawn using a systematic random sampling method where potential respondents were first drawn from a registry of current addresses maintained by the local government. From this sample frame a roster was compiled that contained only internet using households and that contained at least one parent and one child. From this roster 1,722 parents and 1,722 children were randomly selected and asked to fill out an online survey which 1,319 parents and 1,319 children completed, yielding a response rate of 77%. For the purposes of this study we use data collected only from the 1,319 youth who completed the survey. Preliminary demographic analysis indicated that these youth are a representative sample of young people who use the Internet at home.

The youth in this survey are between 10 and 16 years in age, and attending grades four thru to the third year of junior high school. There are approximately equal numbers of students in each grade. Network size is operationalized as the total number of peers that young respondents communicate with from class, extracurricular clubs, cram school, art groups, sports groups, and scouts/girl guides. The mean network size is 24, the median is 17, and the distribution of this variable is positively skewed (skewness = 2.01). Network complexity is operationalized as the number of activities listed above in which respondents participate and from which they communicate with at least one peer. The network complexity variable ranges from zero to five, and has a normal distribution -- mean and median scores equal two. We note that while network size and network complexity are positively correlated, a post-hoc VIF test conducted on the multivariate analyses that follows does not show significant levels of multicollinearity.

Frequency of mobile phone e-mail use is operationalized as the number of times respondents use mobile phone e-mail to send messages to friends. Approximately 25 percent of the respondents do not use mobile phone e-mail for this purpose, while 12 percent use it less than once a week to contact friends, 13 percent use it two to three times a week, 13 percent use it four to five times a week, and 37 percent use it every day.

### **Analysis and Results**

To examine the three hypotheses discussed above we run multivariate analysis that treats mobile phone e-mail as the dependent variable, and grade, network size, and network complexity as independent variables. We first run each of these independent variables in a separate model, and then run one model that includes all these independent variables. This latter model is run to take into account the possibility that network size and complexity may also vary by grade, since each additional year of schooling provides new social opportunities. We control for gender, mobile phone experience (having a mobile phone for at least two years), and if respondents have control over their own phone or rely on their parents phone, as these may all be interrelated with the dependent and independent variables.

The first multivariate model (Table 1) considers only the association of our control variables with the dependent variable. It shows that being female is positively associated with the use of mobile phone e-mail (coef. = 0.457;  $p < .001$ ), as is owning one's own mobile phone (coef. = 2.541;  $p < .001$ ). Mobile phone experience -- i.e. using a mobile phone for at least two years -- is not significantly associated with frequent use of mobile phone e-mail to contact friends.

The second multivariate model (Table 1) addresses the first hypothesis by examining the association between network size and frequency of exchanging mobile phone e-mail with friends, while controlling for the influence of gender, owning a mobile phone, and mobile phone experience. The results of this model show a significant positivity association between network size and frequency of exchanging mobile phone e-mail with friends (coef. = 0.009;  $p < .001$ ). This finding clearly supports the first hypothesis, which states that as personal network size increases, the frequency of sending mobile phone e-mail increases.

The third multivariate model (Table 1) addresses the second hypothesis by examining the association between network complexity and frequency of exchanging mobile phone e-mail with friends, while controlling for the influence of gender, owning a mobile phone, and mobile phone experience. The results of this model show no significant association between network complexity and frequency of exchanging mobile phone e-mail with friends (coef. = 0.002;  $p > .05$ ). This result does not show support for the second hypothesis which states that as personal network complexity increases, the frequency of sending mobile phone e-mail increases.

The fourth multivariate model (Table 1) addresses the third hypothesis by examining the association between grade in school and frequency of exchanging mobile phone e-mail with friends, while controlling for the influence of gender, owning a mobile phone, and mobile phone experience. The results of this model show that compared to the frequency of mobile phone e-mail exchanged with friends among respondents in the reference category -- which is the lowest grade among the respondents -- frequency of mobile phone e-mail exchanged with friends is significantly greater for each successive grade ( $p < .001$ ). Moreover, the coefficients increase steadily in strength with each grade (coef. = 0.773 for



grade 5, coef. = 1.254 for grade 6, coef. = 2.506 for junior high year 1, coef. = 2.680 for junior high year 2, coef. = 2.727 for junior high year 3), indicating a positive linear relationship between grade and frequency of mobile phone e-mail exchanged with friends. This result clearly supports the third hypothesis, which states that as grade increases, the frequency of sending mobile phone e-mail increases.

The fourth multivariate model (Table 1) enters all the main independent variables into the analysis to control for the possibility that grade acts as a factor influencing the positive relationship between both network size and network complexity on the dependent variable. The coefficients and levels of significance for these variable remain similar to previous models, indicating that such a spurious relationship does not exist.

Table 1

	Model I	Model II	Model III	Model IV	Model V
Female	0.457 ***	0.488 ***	0.456 ***	0.720 ***	0.762 ***
	0.129	0.129	0.129	0.136	0.138
2 Years Experience	0.010	-0.011	0.010	-0.197	-0.222
	0.136	0.136	0.136	0.144	0.145
Own a Mobile (Ref = parent's mobile)	2.541 ***	2.572 ***	2.542 ***	2.159 ***	2.188 ***
	0.156	0.157	0.157	0.161	0.163
Network Size		0.009 ***			0.011 ***
		0.003			0.004
Network Complexity			0.002		-0.007
			0.067		0.081
Grade (Ref = Grad 4)					
Grade 5				0.773 ***	0.782 ***
				0.266	0.267
Grade 6				1.265 ***	1.261 ***
				0.254	0.254
Junior high 1				2.506 ***	2.535 ***
				0.259	0.260
Junior high 2				2.680 ***	2.682 ***
				0.268	0.270
Junior high 3				2.727 ***	2.754 ***
				0.270	0.271
Cutoff 1	0.508	0.731	0.513	1.816	2.074
	0.157	0.178	0.236	0.245	0.314
Cutoff 2	1.304	1.529	1.309	2.751	3.012
	0.165	0.185	0.241	0.258	0.325
Cutoff 3	2.056	2.287	2.061	3.662	3.932
	0.175	0.195	0.248	0.273	0.338

Cutoff 4	2.743	2.983	2.749	4.468	4.748
	0.183	0.204	0.254	0.283	0.347
Pseudo R2	0.120	0.123	0.120	0.193	0.197
LR Chi2	320.39	328.10	320.39	514.69	524.59
N	890	890	890	890	890

\*\*\* p < .001      \*\* p < .01      \* p < .05

## **Discussion and Conclusion**

Using the socio-emotional selectivity theory we have posited that the heavy use of mobile phone e-mail among Japanese adolescents can be attributed to its use as a tool that facilitates social exploration. According to socio-emotional selectivity theory, as youth enter adolescence they increasingly have the perception that time is open-ended, motivating them to focus on exploring new relationships that act as new sources of knowledge at the expense of stable relationships that provide emotional support. The transition to adolescence is accompanied by increasing cognitive ability which is necessary to navigate more complex and fluid peer relationships. We believe that it is this combination of intrinsic motivation and cognitive ability that increasingly leads adolescents to use mobile phone e-mail to form and maintain new peer relationships as they mature.

To examine the validity of this argument we draw on a systematically selected sample of internet using youth living in the greater Tokyo area. We hypothesize that network size, network complexity, and grade will all be positively associated with the frequency of sending mobile phone e-mail to peers. As expected, our results show that both network size and grade are positively associated with the frequency of sending mobile phone e-mail to peers. However, we did not find a positive relationship between network complexity and the frequency of sending mobile phone e-mail to peers

We suspect that our measure of network complexity may not have sufficiently exhausted all aspects of network complexity. On the one hand, the measure focuses on complexity that occurs as the result of knowing individuals in different social settings. Our assumption was that knowing people in different social settings acts as a source of complexity because these groups may be spatially and socially separate. On the other hand, it is possible that although these peers are known in different settings, they are all part of the same peer group. In this case a network would not be as complex as the measure would indicate. Given this possibility we recommend that future research measure network complexity more directly, perhaps using standard density measures or other indicators that network members do not share the same social space.

We also suggest that future research look more closely at strategies that youth use to navigate large and complex personal networks as they mature. Although our analysis has taken the first step of showing that the frequent use of mobile phone e-mail is associated with network size and grade level, future research using some combination of refined measures in a longitudinal setting, participant observation, and in-depth interviews, would provide a deeper understanding how this phenomena unfolds.

We end by noting that although this paper uses somewhat unusual theoretical and methodological approaches to understanding the significance of mobile phone e-mail among Japanese youth, the findings presented here do not deny the value of existing research on this topic. It is possible that mobile phone e-mail is used both to bond with a small group of peer relationships, while at the same time being used to

form and maintain larger sets of weak relationships. Therefore, rather than viewing these results as being contrary to existing findings, they can instead be interpreted as providing a new focus -- and potentially a new avenue of research about increasing important phenomena.

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